

DIRECTORATE GENERAL OF SEA COMMUNICATION
MINISTRY OF COMMUNICATIONS
THE REPUBLIC OF INDONESIA

THE STUDY ON INTEGRATED MODERNIZATION PLAN FOR SEA TRANSPORTATION IN EASTERN INDONESIA

FINAL REPORT

SUMMARY & MASTER PLAN



MARCH 1994

THE OVERSEAS COASTAL AREA DEVELOPMENT INSTITUTE OF JAPAN (OCADI)
THE MARITIME INTERNATIONAL COOPERATION CENTER OF JAPAN (MICC)
THE OVERSEAS SHIPPING AND COOPERATION CENTER OF JAPAN (OSCC)
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JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
DIRECTORATE GENERAL OF SEA COMMUNICATION
MINISTRY OF COMMUNICATIONS
THE REPUBLIC OF INDONESIA

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FOR SEA TRANSPORTATION
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SUMMARY 1. MASTER PLAN

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(June 1993)

PREFACE

In response to a request from the Government of the Republic of Indonesia, the Government of Japan decided to conduct the study on Integrated Modernization Plan for Sea Transportation in Eastern Indonesia and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Indonesia a study team headed by Mr. Takao Hirota, President of the Overseas Coastal Area Development Institute of Japan (OCDI) and composed of members from this institute, the Maritime International Cooperation Center of Japan (MICC), the Overseas Shipbuilding Cooperation Center of Japan (OSCC) and Japan Port Consultants, Ltd. (JPC), five times between November 1992 and March 1994.

The team held discussions with the officials concerned of the Government of Indonesia, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Indonesia for their close cooperation extended to the team.

March 1994



Kensuke Yanagia
President

Japan International Cooperation Agency

LETTER OF TRANSMITTAL

March 1994

Mr. Kensuke Yanagiya
President
Japan International Cooperation Agency

Dear Mr. Yanagiya,

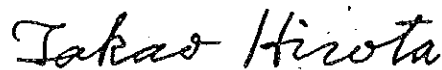
We are pleased to submit to you the Report for the Study on Integrated Modernization Plan for Sea Transportation in Eastern Indonesia. The Report contains the advice and suggestions of the authorities concerned of the Government of Japan and your Agency as well as the formulation of the above mentioned project. Also included are comments made by the Directorate General of Sea Communication, Ministry of Communications of the Government of the Republic of Indonesia during technical discussions on the draft report which were held in JAKARTA.

This report presents Integrated Master Plan for Sea Transportation in Eastern Indonesia including the package plan for investment during the project period of 1994 to 2005 and Feasibility Study on the ports of Bitung and Kupang with a target year of 2000.

In view of the urgency of promoting sea transportation in Eastern Indonesia and of the need of for socio-economic development of the Republic of Indonesia as a whole, we recommend that the government implement this Project as a top priority.

We wish to take this opportunity to express our sincere gratitude to your Agency, the Ministry of Foreign Affairs, the Ministry of Transport and the Japanese Embassy in Indonesia and the JICA Indonesian Office for their valuable advice and support. We also wish to express our deep gratitude to Directorate General of Sea Communication, Ministry of Communications and other authorities concerned of the Government of the Republic of Indonesia for the close cooperation and assistance extended to us during our investigations and study.

Very truly yours,



Takao Hirota
Team Leader

The Study on Integrated Modernization Plan
for Sea Transportation in Eastern Indonesia
(President, the Overseas Coastal Area
Development Institute of Japan)



Study Area

ABBREVIATIONS LIST

A	ADPEL	Port Administrator
	AMDAL	Environmental Impact Analysis
	AMK A	3rd Grade License of Marine Engineer for Unrestricted Trade
	AMK B	2nd Grade License of Marine Engineer for Unrestricted Trade
	AMK C	1st Grade License of Marine Engineer for Unrestricted Trade
	AMK PI	4th Grade License of Marine Engineer for Restricted Trade (Engineer for interisland Trade)
	AMK PT	5th Grade License of marine Engineer for Local Trade
	ATN	Aids To Navigation
	AV.	Average
	AVI	Declaration of Inter-island Cargo Loaded
B	BALI	Indonesian Sea Transport Council
	BAPEDAL	Environmental Impact Management Agency
	BAPPEDA	Provincial Development and Planning Board
	BAPPENAS	National Development Planning Agency
	BASARNAS	National Search and Rescue Agency
	BIRO	Bureau
	BKI	Indonesian Ship Classification Society
	BOR	Berth Occupancy Rate
	BPI	Berth Performance Index
	BPLP	Merchant Marine Academy (Semarang, Ujung Pandang) offering STRATA A Course only
	BPLPD	Public Rating School (Surabaya, Barombong)
	BPS	Central Bureau of Statistics
	BTP	Berth Throughput
	BUMN	State Owned Enterprise
C	CARAKA JAYA	Name of the Project for New Building of Standard Type General Cargo Ship 3,000-4,180 DWT Class.
	COC	Certificate of Competency

C	COSPAS-SARSAT	Space System for Search of Distress Vessels-SAR Satellite-aided Tracking
	CRS	Coast Radio Station
	CUBDIT-DPAL	Sub Directorate of Data and Control of Sea Transportation and Traffic
D	DF-OMEGA, DF	Diferencial OMEGA System
	DGLT	Directorate General of Land Transport and Inland Waterways
	DGSC	Directorate General of Sea Communication
	DIP	Decided Project Table of the Government Budget
	DISNAV	Districts of Navigation
	DITJASMAR	Directorate of Maritime Service
	DITKAPPEL	Directorate of Shipping and Marine Safety
	DITKPLP	Directorate of Sea and Coast Guard
	DITLALA	Directorate of Sea Transportation and Traffic
	DITNAVICASI	Directorate of Navigation
	DITPELPENG	Directorate of Port and Dredging
	DKB	Name of Shipbuilding Company (Dok Perkapalan Kodja Bahari)
	DPP PELRA	Indonesian People Shipping Owners' Association
	DSC	Digital Selective Calling
	DWT	Dead Weight Ton
	D-III	Diploma-III, one of Qualification on Civil Effect
E	EIA	Environmental Impact Assessment
	EMKL	Sea Freight Forwarding Company
	EPIRB	Emergency Position Indicating Radio Beacon
	ETA	Education and Training Agency
F	FAO	United Nations Food and Agriculture Organization
	F-ST-12	Improvement Plan for Coastal Radio Station Facilities NO12
	F-TA-308	Improvement Plan for Maritime SAR Communication and Information System NO308
	FIRR	Financial Internal Rate of Return

G	GDP	Gross Domestic Product
	GMDSS	Global Maritime Distress and Safety System
	GOI	Government of Indonesia
	GPS	Global Positioning System
	GRDP	Gross Regional Domestic Product
	GRT	Gross Registered Tonnage
	GT	Gross Tonnage
H	HF	High Frequency
	HP	Horse Power
	HSD	High Speed Diesel
I	IALA	International Association of Lighthouse Authorities
	IBRD	International Bank for Reconstruction and Development
	ILS	Inter-Island Liner System
	IMDS	Integrated Maritime Database System
	IMPRES	Presidential Instructions
	INPRES 4/1985	Presidential Instruction No.4 in 1985
	INSA	Indonesian National Ship Owners' Association
	IP-275	Loan Agreement NO-275
	IPERIONDO	Indonesian National Shipbuilding Industries Association
	ISTS	Integrated Sea Transport Study
J	JICA	Japan International Cooperation Agency
	JKT	Jakarta
K	KANPEL	Governmental Office at Non-commercial Port
	KANWIL	Provincial Office
	KANWIL DEPHUB	Regional Office of Ministry of Communications
	KHUSUS	Special Sipping
	KLH	Ministry of State for Population and Enviroment
	KM	Decree of the Minister
	KOPERASI TKBM	Port Labour Corporation
	KPI	Indonesian Seamen Union
	KPLP	Directorate of Sea and Coast Guard

L	LAN	Local Area Network
	L.BE	Lightbeacon
	L.BU	Lightbuoy
	LENGTH(O.A.),LOA	Length Overall
	LENGTH(P.P.)	Length Between Perpendicular
	L.HO	Lighthouse
	LORAN-C	Long Range Radio Navigation Aids
	LPG	Liquefied Petroleum Gas
	LUT	Local User Terminal
M	MARPOL	Final Act of the International on Marine Pollution
	MES	Message Exchange System
	METC	Maritime Education and Training Center
	MF	Medium Frequency
	MIA	National institute of Administration
	MMA	Merchant Marine Academy
	MMMS	Merchant Marine Middle School
	MOC	Ministry of Communications
	MOEC	Ministry of Education and Culture
	MOF	Ministry of Finance
	MOI	Ministry of Industry
	MOM	Ministry of Manpower
	MPB I	1st Grade License of Navigation Officer for Unrestricted Trade
	MPB II	2nd Grade License of Navigation Officer for Unrestricted Trade
	MPB III	3rd Grade License of Navigation Officer for Unrestricted Trade
	MPI	4th Grade License of Navigation Officer for Restricted Trade (Mate for Interisland Trade)
	MPT	5th Grade License of Navigation Officer for Local Trade
	MRS	Maintenance, Repairs and Supplies
	MSDP	Maritime Sector Development Program
	MSTC	Maritime Safety Training Center
	MSTP	Maritime Sector Training Programme
	M/TON	Metric ton (1000 kgs)
	MWRB	Medium Wave Radio Beacon

N	NAVAID	Navigation Aids
	NBDP	Narrow Band Direct Printing Telegram
	NIA	National Institute of Administration
	NNSS	Navy Navigation Satellite System
O	OD	Origin and Destination
	OJT	On the Job Training
P	PAKNOV/88	Regulation Reform Package in 1988
	PAO	Port Administrator's Office
	PD-I	Basic Seaman's Course for SKP Certificate
	PD-II	Local Officer Course for MPT, AMK-PI Certificate
	PD-III	Interisland Officer Course for MPI, AMK-PI Certificate
	PEL	Preliminary Environmental Evaluation Report
	PELNI	Indonesian National Shipping Company
	PERINITS	Pioneer Ship System to Serve Remote Areas
	PERLAMIS	Sea Communication Management Information System
	PERSERO	State-owned Company
	PERTAMINA	State-owned Oil Company
	PERUM ASDP	State-owned Ferry Terminal Company
	PERUMPEL	Port State Enterprise
	PIANC	Permanent International Association of Navigation Congress
	PIL	Preliminary Environmental Information Report
	PL	Sailing Vessel
	PLAP	Merchant Marine Academy (Jakarta) Offering Not Only STRATA A but STRATA B, C Courses
	PLM, KLM	Sailing Vessel with Engine
	PP	Government Regulation
	PPI	Port Performance Index
	PROKASIH	Clean River Program
	PSTN	Public Switched Telephone Network
	P.T.	Limited Company
	PT. PANN	National Fleet Development And Multi-Finance Company
	PUP	State Maritime Examination and Certification Board
	PUPD	Implementing Agency of SMECB

P	P2T	Center of Port Service
	P4T	Integrated Control and Service Planning Center
R	RACON	Radar Beacon
	REPELITA	Five Year National Development Plan
	RKL	Environmental Management Plan
	RLS	Regular Liner Service
	RP.	Rupiah
	RPL	Environmental Monitoring Plan
	R&D	Resarch and Development
S	SAR	Maritime Search and Rescue
	SEL	Environmental Evaluation Study
	SGS	Cargo Surveying Society
	SIMLALA	Sea Transport Management Information System
	SIMOPPEL	Port Operational Management Information System
	SKP, SKPD	Certificate for Basic Seaman's Skill
	SKU	Permit for General Agency
	S.M.	Sea Mile
	SMECB	State Maritime Examination and Certification Board
	STCW	International Convention on Standard of Training, Certification and Watchkeeping for the Seafarer, 1978
	STP	Special Trade Passenger
	STRATA-A	Maritime Course to Given a Civil Effect (Diploma III) to Students in Public Merchant Marine Academies under Supervision of MOC
	STRATA-B	Maritime Course to Given a Civil Effect (S-I) to Students in Merchant Marine Academy (Jakarta)
	STRATA-C	Maritime Course to Given a Civil Effect (Specialist-1) to Students in Merchant Marine Academy (Jakarta)
T	TEU	Twenty Foot Equivlent Unit
	TDM, TDMA	Time Division Multiple Access
	TLC	Tons of Lifting Capacity
	TOJ	Training on the Job
	TON/M3, T/M3	Metric ton or Cubic meter, as freighted
	TOR	Terms of Reference

U	UNL.BE	Unlightedbeacon
	UNL.BU	Unlightedbuoy
V	VHF	Very High Frequency
	VTS	Vessel Traffic Service
\$		Dollar

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CONCLUSIONS AND RECOMMENDATIONS

General

1. Indonesia has achieved remarkable economic development. Even during the recent world wide recession, Indonesia has maintained an annual growth rate of more than 5%.
2. This economic success is largely attributed to the series of deregulations and liberalization in various sectors including finance, industry and shipping.
3. Fruits of the economic growth, however, have not been evenly distributed in the country. Eastern Indonesia has remained as a less developed area compared to Western Indonesia.
4. This trend seems unlikely to change and the gap between the East and the West will further be widened.
5. Reason for this gap is primarily due to the topographic characteristics of Eastern Indonesia where a number of small islands are scattered over a vast area.
6. Even though Eastern Indonesia has a population of over 29 million population which is approximately 16% of total Indonesia and slightly greater than that of Malaysia, most private investors prefer Java to Eastern Indonesia for its economic efficiency.
7. Insufficient infrastructures hinder to the development in the East. Among various infrastructures, maritime transportation is one of the most important elements for the area.
8. The Government of Indonesia is aware of this fact and since the beginning of REPELITA V, budget allocation has been shifted to Eastern Indonesia.
9. In fact, DGSC shifted the weight of budget allocation for the port facilities from central and Western Indonesia to Eastern Indonesia in recent years.
10. Restructuring of sea communication system in 1988 resulted in general improvement and modernization to the sector. Deregulation of shipping industry as a whole in Indonesia has stimulated private sectors and generally accelerated competition in the service.
11. Advantages of the restructuring in the maritime transport are more concentrated in Western Indonesia. In the west, a greater volume of trade exists, providing a more suitable environment for modernization.
12. On the other hand, the modernization of shipping has had little effect on Eastern Indonesia.
13. Supply of vessels, which was also subject to government planning, is now possible from international sources besides the government's on-going Caraka jaya scheme which finances standardized cargo vessel.
14. Modernization in shipping has promoted use of containers. Containerization is rapidly increasing in international trade. Some local general cargoes have also started

to become containerized.

15. Ferry services as an extension of the road network are increasing as part of the growth of connecting highway network. Long distance ferry or roll-on roll-off service will supplement some inter-island cargo movement.

16. The new open port policy in stead of the four gateway ports system together with new custom clearance system has increased the number of ports for foreign trade.

Problems of Sea Transportation and Modernization

17. Due to unbalanced volume of cargo movement, shipping operation of regular inter-island service is unprofitable.

18. The result of the deregulation of the shipping lines has brought some side effects to less profitable routes.

19. Liberalization of shipping tends to reduce shipping service for less profitable routes. Limited quantity of cargo generated from Eastern islands is less attractive for regular inter-island ships.

20. Continuity with the previous classification of shipping lines and categories has been lost. Many private shipping companies no longer provide precise operational data for statistical purposes. DGSC has no means to enforce statistic compilation because most lines are no longer subject to licensing for shipping routes.

21. While the government tries to promote Eastern Indonesia by shifting weight of budget allocation from the West, the total budget for the transport sector was reduced in the new five year plan. This is due to introduction of the PERSERO system in the port management of the major ports and due to deregulation of shipping business which are expected to contribute sufficient revenue by expansion of activities.

22. Investment by private sectors for ports and shipping business and revenue to PERSERO, however, are not yet effectively increasing in Eastern Indonesia. This is because the area still lacks sufficient infrastructures. PERSERO is not able to furnish the needs of facilities by its own resources and most other private sectors have not yet reached the stage where they enjoy profits from the vast and undeveloped areas of Eastern Indonesia.

23. Supply of vessels from international sources, both new and used, has supplemented shortage of inter-island fleet. However, this has exposed interisland shipping operations to the fluctuation of the international shipping market, directly affecting the service level of domestic routes. But the newly introduced Caraka jaya steel vessels are not quite profitable because of low level of freight rate in the project area. This is partly because of severe competition with the existing low cost over-aged depreciated steel vessels and wooden sailing ships and partly because of the relatively high financial cost and low productivity of shipyards for the new building scheme.

24. Level of ship maintenance is generally low. Severe competition among shipping companies is one of the reasons of poor maintenance. All the same, poor maintenance results in higher costs when major repairs are needed. Insufficient repair

facilities at the docks also contribute to the poor level of maintenance. Insufficient and inadequate ship inspections also cause poor condition of vessels.

25. Lack of maintenance and repair facility for vessels greater than 1,000 DWT in Eastern Indonesia necessitates an extra trip to Java for docking and inspection and adds to their operation costs.

26. Number and quality of properly trained seafarers are not sufficient to cope with growing demands. Particularly, training for qualified ratings is needed.

27. Even though containers, both international and domestic, have been gradually introduced in Eastern Indonesia in recent years, reception facilities are inadequate at most of the ports. Most of the quay structures are not strong enough to receive heavy weight cargo and suitable mechanical equipment is not available.

28. According to present practice of DGSC budget allocation, construction budget for berth extension will not be made available until berth occupancy rate exceeds 70% in the port. Cargo handling equipment will not be acquired unless sufficient revenue from the equipment is expected.

29. This budget allocation principle is quite understandable under present tight budget circumstance. However, quite frequently, potential traders and investors lose interest in conducting business because of the poor facilities at the ports.

30. Jurisdiction of ferry terminal belongs to DGLT. This arrangement has, occasionally, caused insufficient planning coordination on terminal location. Traffic handled by ferry is not consistently recorded in the shipping statistics.

31. Aids to navigation are far from sufficient in Eastern Indonesia where the number of islands and reefs are greater than in the Western area. Number of supporting vessels for aids to navigation are also insufficient in the area.

32. Search and rescue facilities are also inadequate in the area. Besides insufficient number and size of search and rescue vessels, communication facilities for this purpose also need reinforcement.

33. Statistics relating to the marine transportation have long been neglected. Statistics for cargo and passengers, for example, are incomplete or inconsistent. Many other data and information also require improvement in compilation or reporting system. Establishment or upgrading of data base for registered ships, maritime accidents, seafarers etc., are urgently needed as essential tools for effective execution of DGSC mission.

Master plan

34. Basic objective of the study is to promote the economy and public welfare of Eastern Indonesia through modernization of the sea transportation system.

35. In order to reduce the economic gap between Western Indonesia and Eastern Indonesia investment of both public and private sectors needs to be promoted. For attaining such goals, average growth rate of GRDP in Eastern Indonesia has to be greater than the national average.

36. While the national average annual growth rate of GDP is set to 6%, GRDP

for Eastern Indonesia is expected to grow 6.5% annually.

37. With this economic growth, volume of cargo and passenger movement in Eastern Indonesia will increase considerably.

38. Shipping network in the year 2005 is made out based upon OD (origin and destination) analysis.

39. As economic development and industrialization progress in the project area, cargo movement will gradually be more oriented to the new regional centers rather than traditional all Java oriented pattern in future.

40. Based upon traffic projections, both cargo and passenger in the target year of 2005 will become approximately three times greater than the present volume. Taking into consideration the improvement in ship's operating condition, required shipping capacity must be approximately 150% of present capacity in the same year.

41. Assuming tonnage of Rakyat fleet remains at the present level, and 50% of existing steel vessels will have to be replaced, approximately 335,000DWT (312,200 GT) of new tonnage for common carriers must be built during this period.

42. Replacement and supplement of such a fleet can be achieved either by domestic ship building or supply from international sources.

43. If to pursue a cheap shipping rate in the project area were the main target, extensive use of second hand ships acquired from international market supplemented with Rakyat fleet would be the best solution.

44. However, safety and quality of shipping service can not be improved with such a scheme. In order to promote Eastern economy by attracting more investors from outside, the shipping industry in the project area must provide efficient and reliable service. Consequently, strengthening of shipping fleet by new building will be more suitable for the purpose.

45. The required new tonnage should be supplied by the Indonesian shipyards because supporting to the domestic shipping industry is the most essential role of the Indonesian shipbuilding industry. If their capacity is developed with 10% of growth rate each year in this period, the required new tonnage corresponds with about 30% of total shipbuilding capacity.

46. Introduction of series construction of standard ships and increase of productivity in existing shipyards are absolutely necessary to build the new tonnage with proper quality, accurate delivery and reasonable cost.

47. Three standard size ships shall be introduced to meet the demand of prospective shipping network. The new Perintis ships shall have basically the same design with S type standard ship with passenger accommodation.

48. With the modernized and strengthened fleet, the reliability, safety, frequency as well as carrying capacity of the shipping service in Eastern Indonesia will be improved.

49. In order to assure quality of shipping service, stricter control on establishment of shipping companies is needed.

50. For promotion of shipping route to remote and isolated areas, Perintis shipping is important. The Perintis shipping is supposed to support basic transportation needs in rural areas thus promoting public welfare and civil minimum. Present condition of Perintis shipping, however, is not quite satisfactory. To improve the situation on government support seems to be required including procurement of Perintis ships, enhancement of subsidies in operation and construction of port facilities.

51. According to the increase of passenger traffic in Eastern Indonesia, adequate fleet tonnage of passenger ships should be prepared on time in addition to the Perintis Line fleet as a national policy.

52. For the improvement of operational efficiency and safety, a key yard for repairing and inspection is necessary in Eastern Indonesia. Reinforcement of PT. Waiame shipyard in Ambon is one of the solution.

53. Regarding the maritime safety in the project area, upgrading of ship inspection and introduction of safe operation management system will be needed. If stricter inspection is applied, marine accidents by defects of vessels will be reduced and, at the same time, some of the financially weak small shipping companies will be eliminated.

54. Maritime safety in Eastern Indonesia will also be improved through enforcement of aids to navigation and search and rescue facilities including communication systems.

55. In order to eliminate human elements from marine accidents, improvement of seafarers quality is essential. Particularly, supply of qualified ratings has to be increased. For that purpose, establishment of a new rating school in Eastern Indonesia is contemplated. At the same time, a new training ship for common use for maritime academies and rating schools will be needed.

56. Improvement and expansion of port facilities in the project area is very important for efficient shipping operation. At the same time efficient ports will promote industrial development in the vicinity of the ports. Although most resource oriented industries will be located in adjacent areas of special ports, industrialization also affects activities of neighboring public ports.

57. Public ports in Eastern Indonesia are divided into two categories, namely over middle class ports and small ports. The over middle class ports should strengthen functions as intra-regional distribution centers. At the same time some of the major commercial ports should carry gateway functions to regions in the domestic sea transportation as well as in international trade.

58. The small ports, on the other hand, are required to achieve equal distribution of development benefits. To secure connections between remote islands and the main island, necessary port facilities shall be provided at least on the inhabited islands in such a way that vessels of the requisite scale can safely enter and leave. Priority of small port development should be given to the Perintis ship calling ports.

59. Introduction of modernized maritime transport technology including containerization and Ro-Ro systems will contribute to improvement of overall transportation efficiency but require capital investment at the ports.

Recommendation

60. In order to achieve economic development of Eastern Indonesia through modernization of shipping, following project packages, which may have suitability for potential international financial assistance, are identified. The investment program should be implemented during the project period of 1994 to 2005.

Package Plan

		1st Stage (1994/1996)	2nd Stage (1997/1999)	3rd Stage (2000/2002)	4th Stage (2003/2005)	TOTAL (1994/2005)	
Shipbuilding	P-type ships (Number of ships)	8	12			20	
	Part of other type ships			11	10	21	
	Passenger ships	1	6	2		9	
	Waikame Shipyard		1/Ambon			1	
	Sub-total (Rp. Bn.)	259.1	857.2	354.1	187.0	1,657.4	
Port	Sampit (Number and length of Berths)		4B (280 m)		3B (210 m)	7B (490 m)	
	Benjamasin		17B (1870 m)		19B (2130 m)	36B (4000 m)	
	Lembar		2B (260 m)		3B (390 m)	5B (650 m)	
	Kupang	1B (170 m)		2B (340 m)		3B (510 m)	
	Dili		1B (130 m)		1B (130 m)	2B (260 m)	
	Balikpapan	3B (510 m)		6B (1120 m)		9B (1630 m)	
	Samarinda		9B (990 m)		5B (550 m)	14B (1540 m)	
	Bitung	3B (590 m)		5B (850 m)		8B (1440 m)	
	Pantoloan		1B (130 m)		2B (260 m)	3B (390 m)	
	Ujung Pandang	4B (760 m)		7B (1290 m)		11B (2050 m)	
	Pare Pare		2B (260 m)		2B (260 m)	4B (520 m)	
	Kendari		1B (130 m)			1B (130 m)	
	Ternate				2B (320 m)	2B (320 m)	
	Ambon	1B (170 m)		4B (780 m)		5B (950 m)	
Sorong		1B (170 m)			1B (170 m)		
Bikak	1B (170 m)				1B (170 m)		
Jayapura		1B (130 m)		1B (130 m)	2B (260 m)		
	Middle Class Ports (Rp. Bn.)	442.5	642.9	700.0	614.9	2,400.3	
	Small Class Ports (Rp. Bn.)	135.8	273.3	273.3	267.6	950.0	
	Sub-total (Rp. Bn.)	578.3	916.2	973.3	882.5	3,350.3	
ATN	Lighthouse (40m)	13	6	6	3	28	
	Lightbeacon (30m)	13	8	5	0	26	
	Lightbeacon (20m)	13	10	0	0	23	
	Lightbeacon (10m)	105	76	41	0	222	
	Light Buoy	65	65	65	58	253	
	Radar Beacon	86	73	58	44	261	
	Loran - C System	0	1	0	1	2	
	Vessel Traffic Service (VTS)	0	0	0	1	1	
	Multi-purpose Buoy Tender Vessel (MB)	0	3	2	1	6	
	Supply and Aids Tender Vessel (SA)	6	6	2	0	14	
	Aids Tender (AT)	5	0	1	0	6	
	Inspection Boat (IB)	1	1	1	1	4	
		Sub-total (Rp. Bn.)	224.1	360.8	139.2	228.0	952.1
	SAR	SAR ship of Class I-A	1/Surabaya	0	1/U. Pandang	0	2
SAR Ship of Class I-B		0	1/Ambon	0	1/Bitung	2	
SAR Ship of Class II		1/Jayapura	1/Kupang	1/Balikpapan	0	3	
Pier for Class I-A Ship		1/Surabaya	0	1/U. Pandang	0	2	
Pier for Class I-B Ship		0	1/Ambon	0	1/Bitung	2	
Special Rescue Team		1/Surabaya	1/Ambon	1/U. Pandang	0	3	
		Sub-total (Rp. Bn.)	80.0	61.2	80.0	38.2	259.4
Seafarer	A Rating School	1/Ambon or Sorong					
	A Training Ship		1/E. Indonesia				
		Sub-total (Rp. Bn.)	45.6	77.1	0.0	0.0	122.7
	TOTAL (Rp. Bn.)	1,187.1	2,272.5	1,546.6	1,335.7	6,341.9	

61. It is recommended that the government of Indonesia promote the shipping business particularly on following matters.

- (a) Since Eastern Indonesia is less developed compared to the West, the government should give favorable treatment to attract more private investment to the area.

(b) Establishment of shipping companies should be restricted in order to eliminate unsound operators and to stabilize shipping service.

(c) Foreign vessels especially short-term or trip charter vessels should be restricted for domestic common carriers in order to stabilize shipping service and freight rate.

(d) Financial arrangement for standard-type ship building should be improved so that the financial cost for the operators is reduced.

(e) Modest increment of freight rate for inter-island shipping should be permitted so that the shipping management can be stabilized.

(f) Appointment of Perintis operators should have at least 3 continuous years of contract period.

(g) DGSC subsidy for the appointed Perintis operators to assure sound management has to be based on calculation by fixed subsidy ratio within budget.

(h) A part of Perintis subsidy cost should be borne by local government.

62. For improvement of the shipbuilding and ship inspection in Indonesia, the following is recommended.

(a) The newbuilding program of new tonnage should be worked out for development of shipbuilding industry as well as modernization of Eastern Indonesian fleet.

(b) In order to successfully complete the newbuilding program, some proper measures to help the shipyards such as design supply, technical assistance at the shipyards and "package deal" for procurement of major components should be considered.

(c) In order to improve the productivity of the Indonesian shipyards, some suggestions such as activation of middle management, promoting worker's will to work etc., will be effective.

(d) Beside the newbuilding program for Eastern Indonesian fleet, a master plan for nationwide development of the shipbuilding industry should be made by both the shipping and shipbuilding sectors in order to set up a concrete developing target in line with the total shipping demand in this country.

(e) The quality and number of ship inspectors should be increased through training course. In this connection, ship inspection organization in Indonesia namely, Biro Klasifikasi Indonesia (B.K.I.) should be utilized.

(f) In order to strengthen the ship inspection in Eastern Indonesia, technical and non-technical support are considered necessary.

63. Regarding port sub-sector development program, the following is recommended;

(a) In order to stimulate economic development in Eastern Indonesia, ports should be regarded as a basic social infrastructure, and be improved so as to help lower the maritime transportation cost.

(b) Feasibility studies should be carried out for the over middle class ports

prior to the implementation of the projects in order to take into consideration the local conditions in detail.

(c) Development priority of the small class ports should be given to the Perintis ship calling ports, and the basic port facilities should be provided at least on the inhabited islands.

(d) The latest information about the noncommercial ports should be compiled into a data base.

(e) To achieve the economic development and public welfare in Eastern Indonesia, national budget for port development should be significantly expanded.

64. In order to upgrade maritime safety, following measures are recommended.

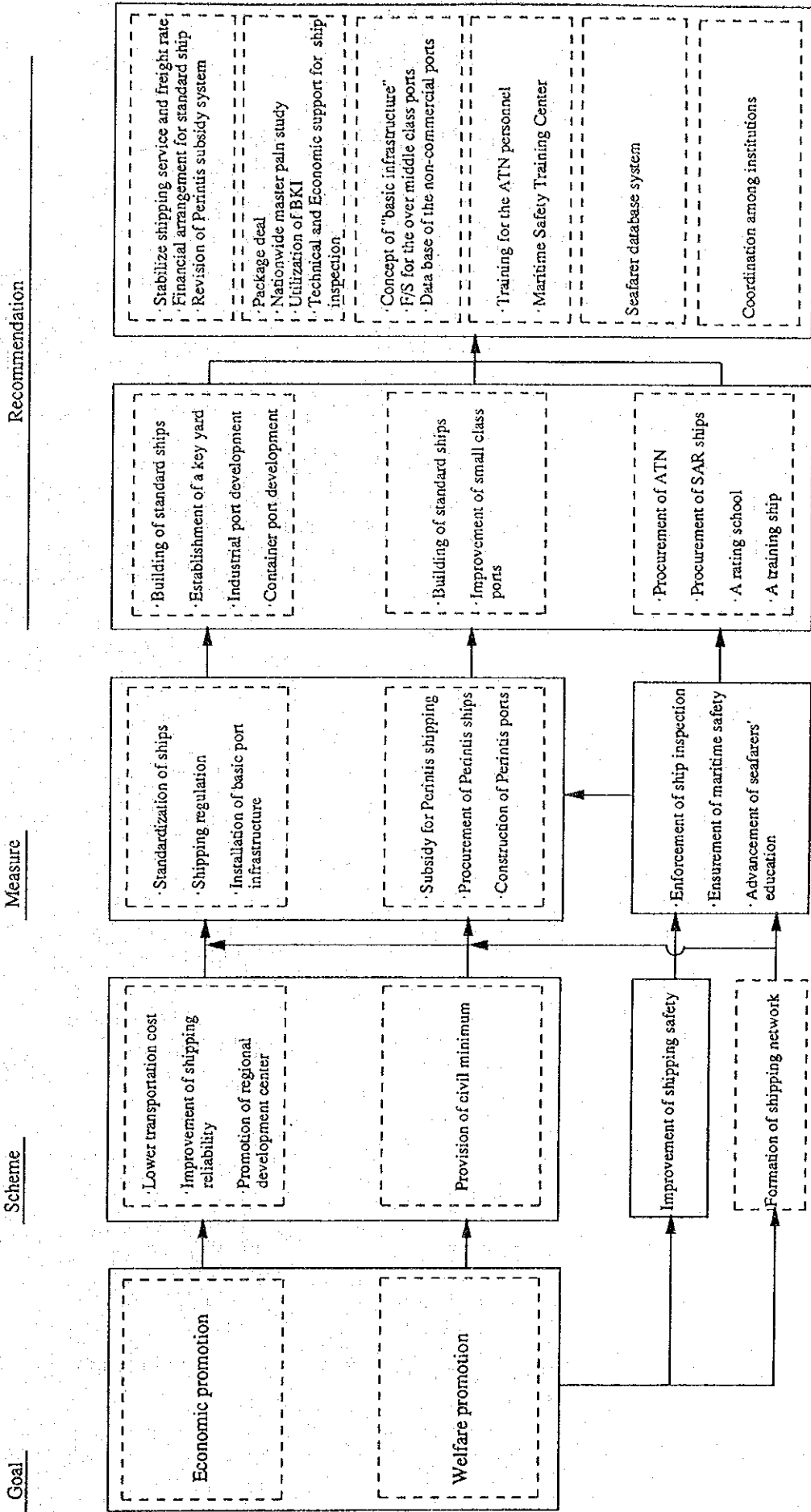
(a) Training must be implemented to provide the ATN personnel with not only fundamental expertise knowledge on maritime safety but also the maintenance and repair policy.

(b) From a short-term viewpoint, a Maritime Safety Training Center (MSTC) is proposed in order to train both newly recruited and active personnel swiftly.

65. Seafarer training program has to be upgraded to meet demand of shipping industry. The following is recommended in this connection.

(a) Seafarer database system should be developed in order to grasp the current situation of shipping industry and make the necessary development plan of seafarers in future.

66. For effective implementation of the projects, closer coordination among various departments and government agencies, both at central and local levels, as well as related industries is necessary.



PART I

PRESENT SITUATION

Chapter 1 INTRODUCTION

A. Background of the Study

1. Economic disparity between Western Indonesia and Eastern Indonesia has been widening, causing social and economic problems. Java island in Western Indonesia is heavily populated though the government of Indonesia has been encouraging people to migrate to Eastern Indonesia. Most of the rich natural resources in the region have remained unexploited.

2. The government of Indonesia understands the importance of developing the Eastern Indonesian region and has paid special attention to this region. Formulation of transportation and communication network and improvement of infrastructures in Eastern Indonesia were given one of the highest priorities in the government's policy making.

3. In response to the request of the Government of the Republic of Indonesia, the Government of Japan has decided to conduct the Study on Integrated Modernization Plan for Sea Transportation in Eastern Indonesia through Japan International Cooperation Agency.

4. Directorate General of Sea Communication, Ministry of Communications shall act as counterpart agency to the Japanese Study Team and also act as coordinating body with other relevant organizations for the smooth implementation of the Study, on behalf of the Government of the Republic of Indonesia.

B. Scope of the Study

5. The main objective of this study is to formulate an integrated master plan for sea transportation in Eastern Indonesia in the year 2005. The study area is composed of 12 provinces in Eastern Indonesia and related areas.

6. The sea transportation in this study consists of five sub-sectors: shipping, shipbuilding and ship inspection, port, maritime safety, and seafarers education.

C. The Study Team and Advisory Committee

7. The Study Team is headed by Takao HIROTA, and composed of eighteen experts in various fields. JICA sets up an Advisory Committee to provide the Study Team with appropriate advice on various aspects of the study implementation. Prof. Takehiko SUGIYAMA chairs the Advisory Committee.

D. Counterparts

8. Directorate General of Sea Communication, Ministry of Communications, the Government of Indonesia, formulated two committees, a supervising committee and a working committee, both of which work closely with the JICA Study Team. Mr. Agus chairs the former committee, and Drs. Tjipto the latter.

Chapter 2 SOCIO-ECONOMIC CONDITIONS IN EASTERN INDONESIA

Demographic characteristics

1. Eastern Indonesia, which in this study comprises 12 provinces shown in Table 2-1, covers an area of 1.18 million sq. km, and accounts for 61 per cent of the total land area. A total of 29,284,000 people lived in Eastern Indonesia in 1990, representing only 16.3 per cent of the entire nation. Overall annual population growth rate in the study area from 1980-1990 was 2.34 per cent, which was higher than the nationwide annual growth rate of 1.98 per cent.

Table 2-1 Population and GRDP and of the Study Area

	Population ('000.) Year '90	Pop. Growth Rate (%) ('80-'90)	GRDP (Bn. Rp.) '89 ex. Oil	GRDP Growth Rate % ('83-'90)	Per Capita GRDP, '000. Rp. '89 ex. Oil	Per Capita GRDP G. Rate, % '83-'90 ex. Oil
Central Kalimantan	1,396	3.88	1,272	7.3	1,018	3.0
South Kalimantan	2,598	2.32	1,944	6.2	799	4.3
East Kalimantan	1,677	4.42	3,787	2.8	2,114	7.6
North Sulawesi	2,478	1.60	1,287	5.2	515	3.6
Central Sulawesi	1,711	2.87	863	7.1	511	3.9
South Sulawesi	6,982	1.42	3,736	6.5	536	5.0
Southeast Sulawesi	1,350	3.66	723	8.2	572	4.7
West Nusa Tenggara	3,370	2.15	1,098	6.0	332	4.2
East Nusa Tenggara	3,269	1.79	1,040	4.9	314	3.4
East Timor	748	3.02	231	7.7	335	4.7
Maluku	1,856	2.78	1,319	8.8	748	5.5
Irian Jaya	1,649	3.46	1,335	4.9	866	5.0
Eastern Indonesia	29,284	2.34	18,635	5.0	669	
Total Indonesia	179,379	1.98	141,447	6.6	799	5.7

Source: Statistical Year Book of Indonesia 1991

Cities

2. There are 11 chartered municipalities in Eastern Indonesia. One-half of the 12 provinces have no chartered municipalities at all in their administrative area, and three provinces have only one chartered municipality, which is their provincial capital. The biggest municipality in Eastern Indonesia is Ujung Pandang (South Sulawesi Province), where 822,009 people lived in 1990.

Economic indicators

3. GRDP excluding oil and gas sector in Eastern Indonesia accounted for 13.2 per cent of the national total, and in per capita terms, it earned 83 per cent of the national average in 1989. During the 1983-1989 period, GRDP per capita in each province of Eastern Indonesia ranged from 8.1% in East Kalimantan to 2.8% in North Sulawesi while that of the national total increased at an annual average rate of 5.3 per cent for the same period.

Sectoral distribution of GRDP

4. Table 2-2 shows sectoral distribution of GRDP for each province and for the nation as a whole in 1988. The sectoral distribution reveals that the agriculture sector remained the largest sector in most of the provinces in Eastern Indonesia. Except for East Kalimantan, provinces in Eastern Indonesia produced a very small portion of provincial GDP through the manufacturing sector. Percentage contribution of this sector to the provincial GDP was 0.9% in Irian Jaya, 1.9% in Southeast Sulawesi, and 2.9 % in East Nusa Tenggara.

Table 2-2 Sectoral Distribution of GRDP, 1988

		Agri. (%)	Mining (%)	Manuf. (%)	Service (%)
Central Kalimantan		31.7	0.4	14.3	53.6
South Kalimantan		27.5	2.7	14.3	55.6
East Kalimantan		9.8	42.8	26.2	21.4
North Sulawesi		35.4	0.8	4.9	59.0
Central Sulawesi		41.1	2.5	7.1	49.3
South Sulawesi		43.5	0.8	6.3	49.4
Southeast Sulawesi		42.6	5.5	1.9	50.1
West Nusa Tenggara		51.8	1.4	2.7	44.2
East Nusa Tenggara		51.5	0.5	2.0	46.0
East Timor		42.8	0.6	15.0	41.6
Maluku		37.4	4.9	11.1	46.6
Irian Jaya		23.8	35.7	0.9	39.6
Total	Indonesia	23.4	13.1	24.3	39.3

Source: 1) Preliminary Survey for Project Formation in the Eastern Part of Indonesia
2) East Timor's Potentials Profile in 1991

Investment

5. Eastern Indonesia received 11.1 per cent of the total national investment, which was lower than that of GRDP. The total investment-GRDP ratios of the 12 provinces in Eastern Indonesia were at lower levels than the national average. Especially private investment-GRDP ratios were considerably lower.

Cargo and passenger flows

6. Table 2-3 shows inter- and intra-province cargo flow in 1988. Regarding the intra-provincial cargo movement, most of the Eastern Indonesian provinces showed very low percentages. East Jawa was placed as the prime trading partner for eight provinces. Of the shipped cargoes from Eastern Indonesia, 32.2 per cent were bound for East Jawa while only 45.1 per cent of the total shipment moved within Eastern Indonesia.

Table 2-3 Cargo and Passenger Movement

Province of Origin	Cargo (1988)				Passenger (1989)			
	Inter-Province		Intra-Pro		Inter-Province		Intra-Pro	
	Destination with the highest share	% of total	% of total	Destination with the highest share	% of total	% of total		
Central Kalimantan	East Jawa	24.9	28.7	East Jawa	100.0	0.0		
South Kalimantan	East Jawa	57.5	5.2	East Jawa	57.7	0.0		
East Kalimantan	East Jawa	39.8	22.8	South Sulawesi	25.8	19.0		
North Sulawesi	East Jawa	47.1	13.2	DKI Jakarta	19.4	4.7		
Central Sulawesi	East Jawa	49.9	7.2	South Sulawesi	20.6	16.1		
South Sulawesi	East Kalimantan	13.9	3.2	East Kalimantan	28.9	0.2		
Southeast Sulawesi	East Jawa	56.8	1.8	Maluku	31.3	0.0		
West Nusa Tenggara	East Nusa Tenggara	25.4	9.6	South Sulawesi	10.4	2.0		
East Nusa Tenggara	East Jawa	49.5	41.9	West Nusa Tenggara	19.8	55.1		
East Timor								
Maluku	East Jawa	50.1	5.4	East Jawa	11.9	51.6		
Irian Jaya	DKI Jakarta	19.1	47.5	East Jawa	12.9	46.2		
Eastern Indonesia	East Jawa	32.2		East Jawa	16.8			
Total Indonesia	DKI Jakarta	13.6		DKI Jakarta	11.0			

Source: 1988 and 1989 OD Tables, Department of Communications

Chapter 3 OVERVIEW OF NATURAL CONDITIONS IN EASTERN INDONESIA

A. Physiography

1. Eastern Indonesia extends over a wide area ranging from 110°E to 142°E (3,500km) and from 5°N to 11°S (1,800km), which comprises Irian Jaya, Kalimantan (except West Kalimantan), Sulawesi, Maluku, East and West Nusa Tenggara and East Timor, surrounded by the Pacific and Indian Oceans, the Jawa, Sulawesi, Flores, Timor, Banda and Arafura Seas, and the Makassar and Maluku Straits. Mt. Jaya (5,039m), Mt. Rantelombola (3,455m) and Mt. Pagonprick (2,438m) are highest in Irian Jaya, Sulawesi and Kalimantan, respectively. Major rivers are Barito, Mahakam, Kapuas and Kahayan in Kalimantan and Mamberamo and Digul in Irian Jaya.
2. The active seismic zone spreads in East Nusa Tenggara, East Timor, Maluku, northern half of Sulawesi and Irian Jaya. Volcanic eruptions and tsunamis or tidal waves caused by earthquakes often bring about severe disasters.

B. Meteorology

3. The climate is tropical (26° to 28°C) and clearly divided into the NW (November to March) and the SE (June to September) monsoons, due to the seasonal shift of the intertropical convergence zone (ITCZ) in north-south direction. Tropical cyclones seldom occur except in the Arafura Sea. Cloud cover is generally high (class 4 to 6) in the northern area (Irian Jaya through Kalimantan) and low (class 2 to 3) in the southern area (East Timor and East Nusa Tenggara), where the full cover is defined as class 8. Precipitation reaches over 4,000mm in Kalimantan and Irian Jaya and falls to below 1,500mm in Nusa Tenggara and East Timor, mainly caused by the NW monsoon, but by the SE monsoon in Maluku and the northern half of Sulawesi. Prevalent monsoon winds are generally weak to moderate. Diurnal alternations due to land breezes in the nighttime and sea breezes in the daytime are distinct along the coast within the width of approximately 30km. Therefore, the maximum daily winds occur in the afternoon.

C. Oceanography

4. Sea surface temperatures are 26° to 29°C. Salinity ranges from 3.5‰ (Arafura Sea) to below 2.9‰ (southern coast of Kalimantan). Tidal ranges are 1.0 to 1.8m (Flores and Sawu Seas), 0.6 to 1.5m (Jawa Sea and Makassar Strait), 0.8 to 1.2m (Pacific Ocean), 0.7m (Maluku Sea) and amplified up to 3 to 5m during transmission over the vast shallow Arafura Sea (southeast coast of Irian Jaya).
5. Swift currents are driven by monsoons (northern coasts of Irian Jaya and Sulawesi, Flores Sea and Seram Sea). Waves are generally below 1.0m to 2.5m except at exposed coasts to both Oceans. Sand drifts exist along the relatively wavy coasts facing both Oceans, which cause beach erosions and sand sedimentations. Siltation is active in Kalimantan and annual maintenance dredging is indispensable in some ports.

Chapter 4 ENVIRONMENTAL ASPECTS

General

1. Indonesia is composed of many islands and is located in an area where three large geological plates cross. This area is very complex and diverse concerning biology and geology. From the environmental preservation point of view, many types of animal and plant life are found in this area. Furthermore, various mineral resources like oil lie under the ground because of the geological characteristics of this area.

Institutional issues

2. Environmental administration in Indonesia had been handled by the Ministry of State for Population and Environment (KLH) which was established in 1983. KLH has been preparing basic policies concerning environmental issues as well as coordinating among the related ministries. It is possible, however, to realize the individual policy only through coordination and adjustment among ministries which are empowered to implement the individual project. In fact, realization of individual policy and plan is implemented through the ministry concerned which is directly responsible for implementation. Because it seemed difficult to take effective countermeasures against the environmental problems which were getting worse under the existing organization, Environmental Impact Management Agency (BAPEDAL) was established in June 1990 based on "DECREE OF PRESIDENT OF THE REPUBLIC OF INDONESIA No.23 Yr 1990 concerning THE BOARD OF ENVIRONMENTAL IMPACT CONTROL".

Legal issues

3. In 1982 "ACT OF THE REPUBLIC OF INDONESIA NO.4 OF 1982 concerning BASIC PROVISIONS FOR THE MANAGEMENT OF THE LIVING ENVIRONMENT" was enacted in Indonesia. This ACT is the basis on which measures of environmental preservation are enacted. Principles concerning environmental control are decided by this ACT, and this ACT serves as the basic guideline for other environmental acts.

Critical issues

4. There are five critical environmental issues in Indonesia. First is "Water pollution", second is "Air pollution", third is "Harmful waste", fourth is "Environmental impact assessment system" and the last is "Global environmental issues".

Chapter 5 POLICY CHANGES ON MARITIME TRANSPORT IN INDONESIA

1. Sea transport in Indonesia was insufficient in the 1970's and the Government's strong involvement in it consequently hampered the activities of the private sector. Cognizant of the importance of sea transport and the necessity for sectoral improvement, the Government has set up an increase in public investment into this sector as well as initiated reforms of related rules and regulations. The result is an unprecedented change in Indonesia sea transport since Repelita III (1979/80 - 1983/84).

2. This change was started by the Integrated Sea Transport Study (ISTS) between 1979 and 1982 and expedited by the Maritime Sector Development Programme (MSDP) in 1983. REPELITA IV (1984/85 - 1988/89) was formulated based on the MSDP which proposed various improvements covering shipping, infrastructure and administration sub-sectors.

3. In the meantime, the following three remarkable policies were employed.

- (a) Four gateway system : The four gateway system was introduced to concentrate international cargo movement on four specific ports, i.e., Tg. Priok, Tg. Perak, Belawan and Ujung Pandang in the world recession of early 1980's. However, the gateway concept was abolished in 1985. Afterwards, 117 ports were opened to international trade.
- (b) PERUMPLE and Perum Pengerukan : The four publicly-owned port corporations and the publicly-owned dredging corporation were established to manage ports in terms of a self-financing system. The former were PERUMPLE I, II, III and IV, and the latter was Perum Pengerukan.
- (c) Scrapping policy : The scrapping policy was introduced in 1984 which ordered the vessels aged above 25 to be scrapped. Initially, this policy was strictly enforced but finally, it was suspended in 1988 owing to the shortage of vessels.

4. In 1985, the Indonesian Government issued the Inpres 4/85 (Presidential Instruction No. 4 of 1985) to further encourage the export of non-oil products. This instruction aimed to enhance the smooth flow of cargo and to reduce transport costs.

5. Although the ISTS had already mentioned partial deregulation concerning sea transport, the Indonesian Government boldly ventured towards total deregulation by virtue of PAK NOV 21/88, dated 21 Nov. 1988. To activate the shipping industry, these measures made possible the arrangement of vessels, routes, and marketing by shipping operators. The major revisions are as follows:

- (a) revision of operation licenses (the five types of licenses for ocean-going, interisland, local, special, and rakyat or people shipping services were reduced to only 2 types of licenses for domestic / international services and "rakyat" services)
- (b) deregulation of shipping operation
- (c) simplification of permit acquisition procedures
- (d) liberalization of routes
- (e) deregulation of foreign vessel operation
- (f) free joint venture

Chapter 6 REVIEW OF THE PRESENT SITUATION IN SHIPPING

A. General Descriptions of Domestic Shipping

Operational characteristics

1. PELNI (Pt. Pelayaran Nasional Indonesia), established in 1952, was reorganized from PN (state enterprise) to PERSERO (state-owned limited liability company) in 1976. However, PELNI is still responsible for the execution of government policies in sea transport. At present, PELNI has 61 vessels.

2. In addition to PELNI, around 50 operators, of medium and small sizes, have been engaged in inter-island shipping business. Most of the shipping operators, with the exception of Rakyat operators, organized the Indonesian National Shipowners' Association (INSA). The number of members is total 521 as of October 1992. On the other hand, Rakyat operators formed the Dewan Pimpinan Pusat Pelayaran Rakyat (DPP PELRA) as their own association. There are about 500 member companies or about 70,000 individual members.

3. The number of domestic fleet once decreased in 1984 due to the enforcement of the scrapping policy, resulting in the shortage of vessels. The domestic fleet is estimated at around 7,000 vessels in 1991. It is noted that chartered foreign vessels are widely used in inter-island trade.

4. When scrapping policy was strictly enforced between 1984 and 1988, the average vessel age went down. At present, however, inter-island cargo vessels more than 16 years of age (and which should already be replaced), account for 72.4%.

5. In general, the efficiency of Indonesia's domestic shipping is low because of the following reasons:

- (a) high number of old vessels;
- (b) long anchorage period and turn-around time due to the shortage of port facilities, poor stevedoring service and cargo waiting time ; and
- (c) many non-commission days due to drydocking and repairs.

Sectoral analysis

6. Inter-island shipping : Inter-island shipping is the most important part of the entire domestic shipping in terms of serving the national backbone of sea transportation. Today, around 50 operators offer liner and tramping services in this field. Due to total deregulation and the increase in the number of operators, the excessive competition has put a strain on their management. Meanwhile, the deregulation, particularly PAK NOV 21/88, have attracted foreign vessels into inter-island shipping.

7. Rakyat (People) shipping : One of the structural characteristics of domestic shipping is the existence of Rakyat shipping as a traditional form besides modernized shipping. Rakyat ships, consisting of wooden vessels measuring around 100 gross tons, accounted for about 39% of the total number of domestic vessels while their cargo handling volume accounted for only 5.7% in 1990. Because the

hull of Rakyat ships is small, they are totally dependent on human labor for loading and unloading.

8. Perintis (Pioneer) shipping : Perintis shipping operation is being subsidized by the Indonesian Government. It has 28 routes with 13 base ports. In 1992, 26 vessels or a total of 15,800 DWT are involved in this operation. Among them PELNI has 13 routes while eight local operators have 15 routes. The total number of voyages made is 488. The history of Perintis shipping is summarized as follows:

- (a) 1974/75 - 1980/81 (7 years): Perintis shipping started in 1974. Direktorat Navigasi furnished its own vessels. The shortage of hull was offset through bidding among private operators.
- (b) 1981/82 - 1986/87 (6 years): SWAKELOLA (self-management) method was applied during this period. In this connection, the Indonesian Government built 14 vessels for the purpose of Perintis shipping and the actual operation of these vessels was entrusted to PELNI. The shortage of hull was offset by PELNI and private operators without bidding. This SWAKELOLA method caused some problems because PELNI was designated both as an administrator and as an operator.
- (c) 1987/88 - 1989/90 (3 years): The SWAKELOLA method was modified to KONTRAK MURNI (contract-based) method. Accordingly, the above mentioned government-owned 14 vessels were transferred to PELNI which was appointed as the solo operator of Perintis shipping. Under this method, PELNI got all operational income, and operational deficits were compensated with government subsidy.
- (d) 1990/91 - present: Under the KONTRAK MURNI method, the Government makes route plans and decides on an operator for each route through bidding.

B. Financial Analysis of Domestic Shipping

9. It is difficult to understand the financial situation of domestic shipping operators due to unavailability of relevant documents and data, except for PELNI. For this reason, the Study Team conducted supplemental interview surveys.

10. The cost components of PELNI and two anonymous private operators indicate that Bunkers and Maintenance/Repair/Supplies compose a larger share in comparison with the other cost items.

11. As for PELNI, more precisely, the passenger services, as a main component of PELNI's operation, summed up some deficits due to the depreciation of vessels in 1988. In 1990, however, the service showed improvement due to the increase in passengers. On the other hand, cargo and Perintis services have been operated in the red since 1989 constantly.

C. Present Sea Transport in Eastern Indonesia

12. In general, the backbone of Indonesia's national economy is Java Island where agricultural and industrial products go in and out and where goods are produced and consumed extensively. Accordingly, the sea transportation in Eastern Indonesia is strongly connected with Java. Concerning daily commodities, the traffic flow from Java to Eastern Indonesia is consistent and considerable. On the other hand, that of the opposite direction and within Eastern Indonesia is limited and

erratic except for raw materials such as oil, wood, and metal. As a result, major routes connecting with major ports and feeder routes between major ports and small ports are formulated naturally.

13. As for inter-island shipping, there are 136 vessels of an average 2000 DWT plying between Eastern Indonesia and Java.

14. In the case of local liner shipping, there are 112 vessels of around 200 GRT operating within Eastern Indonesia. But it is noted that there are a number of so-called local shipping vessels serving inter-island routes.

15. There are 21 vessels of an average 600 DWT serving 23 Perintis routes with government subsidy. As a means of transportation for small ports and limited demand, Rakyat shipping with more than 1,300 vessels are in operation.

16. Table 6-1 shows the overall situation of cargo/passenger traffic by type of route.

Table 6-1 Cargo/Passenger Traffic (1990 and 1991)

Cargo Traffic	1990 (%)		1991 (%)		Passengers Traffic	1990 (%)		1991 (%)	
	Inter-island	9.5	52.5	11.2		58.7	Inter-island	59.1	47.1
Local	2.9	15.8	2.6	13.7	Local	14.0	11.0		
Pioneer Shipping	0.06	0.3	0.07	0.4	Pioneer Shipping	5.2	3.8		
People Shipping	5.7	31.4	5.2	27.2	People Shipping	21.7	38.1		
Sub-total	18.2	100.0	19.0	100.0	TOTAL	100.0	100.0		
Special Shipping	15.7		13.2						
PERTAMINA	56.5		59.9						
Non-Shipping	9.6		7.9						
TOTAL	100.0		100.0						

Note: Cattle is excluded for this purpose.

Note: Yearly figures greatly varies due to differences in the reporting system of passengers embarking at Riau Province (e.g., 486,197 in 1990 and 1,354,026 in 1991).

PELNI Traffic	1990	1991
Total Passengers	2,219,006	2,476,348
(vessels)	(7 ships)	(9 ships)
Interisland share	96.4%	91.5%
National share	57.0%	43.1%

Source: DGSC

17. More than 90% of the passengers were carried by PELNI in 1991. In addition, cargo ships allow passengers on board on dispensation basis, which number exceeded that of the total passengers carried by passenger ships in 1991.

18. Besides passenger ships, there were a total of 35 ferry routes in operation throughout Indonesia under the jurisdiction of the Directorate General of Land Transport and Inland Waterways (DGLT) in 1991. Out of the total 39 ferry routes, 19 routes are located in Eastern Indonesia.

D. Navigational Control

Safe operation management system

19. The passenger ship service and ferry service are playing the very important roles and will play much more important roles for the development in Eastern

Indonesia in the future, and the services by new type of ships such as roll-on/roll-off type ship and jet-foil type ship are expected to be increased.

20. In precedent countries, the domestic passenger ship business mainly consisting of roll-on/roll-off type ships has been successful in minimizing the occurrence of the maritime accidents for long years by the application of the safe operation management system. However, in Indonesia, there is no rule and regulation concerning this system. Therefore, the establishment of the safe operation management system for the domestic passenger ship service and ferry service should be in urgent need.

21. The operation system by the shipping companies serving in Eastern Indonesia have the departmental function order in the company and such companies have the guide books for navigation for use of each Master of ship and for fleet maintenance. But there is no systematical function order to coordinate each division or department and to control the operational matters as a whole in the companies. In other words, it should be necessary for the companies to have consciousness to control every aspect of the operation of ships.

Emergency communication system

22. In order to immediately respond to emergency situations, the Government of Indonesia has developed the following communications system:

- (a) Maritime Search and Rescue (SAR) Communications System: An overall communication network linking 12 areas and vessels at sea by means of telephone, digital radio concentrator system (DRCS) and VHF radio system.
- (b) National Contingency Plan: In order to mobilize local, regional, and national agencies in a prompt, efficient, and integrated manner, this plan was prepared and has been enforced.
- (c) Global Maritime Distress and Safety System (GMDSS): The Government of Indonesia has been developing the GMDSS system to further improve the present SAR communication system.

Database management

23. Since 1987, DGSC has been developing the Management Information System (PERLAMIS), utilizing 12 units of super micro-computer as a statistical tool for maritime data.

24. At present, the system itself is well-managed, but the following problems are pointed out:

- (a) Since reports being submitted to DGSC by shipping and non-shipping companies are not complete, it is hardly possible to prepare sufficient database.
- (b) Because of the hardware's limited capacity, it often takes a long time to process data and to further utilize the software to analyze the accumulated data in accordance with the various requirements.
- (c) The limited capabilities of the executive staff for system analysis and program applications.

Chapter 7 REVIEW OF THE PRESENT SITUATION IN SHIPBUILDING AND SHIP INSPECTION

A. Preface

1. Though Eastern Indonesia is specified as the study area in this report, the study on shipbuilding was conducted on the basis of wider area because major shipbuilders are located outside Eastern Indonesia. The data for this study were collected from DGSC, MOI, BKI, IPERINDO etc. but some ambiguity were found in those data.

B. Outline of Indonesian Merchant Fleet

2. With the aim to see the situation surrounding the shipbuilding the industry, the survey on the outline of the Indonesian merchant fleet was proceeded. The survey was based on the data from BKI because all Indonesian flag ships in excess of 100 GT or 20 meter in length or 100 horse power of propulsive machinery have to be classified to BKI by regulation. As a result, it was found that aged foreign-built ships occupy the majority of the fleet as shown below.

Total tonnage of steel ships except barges: about 2.6 million gross tons (MGT) including dry cargo ships: about 1.2 MGT (include 0.98 MGT of BKI class and average GT per ship 1,777)
oil tankers : about 0.9 MGT (average GT per ship 4,132)
passenger ships : about 0.1 MGT (average GT per ship 7,362)

Among the BKI class dry cargo ships over 500 GT, totaling 365 ships and 700,000 GT, about 70% were built in 1977 or before (They will be 28 years old or more in 2005) and only 11.5% were built in this country.

C. Present Situation of Indonesian Shipbuilders

3. By the data from MOI, the total number of shipyards in the country is 123 but their majority are for repairing work with small scale facility. The number of shipyards capable to build a ship of 500 GT or over is 25 including 9 yards (8 in Jawa and 1 in Sumatra) capable to build a ship of 1,000 GT or more.

4. Production scale of shipbuilding industry in 1992.

New buildings	: 51,037 GT plus 8,649 HP 167,4 Billion Rp.
Repairing	: 3,659,000 GT plus 640,000 HP 137.3 Billion Rp.
Off-shore structure	: 18,750 tons 400.0 Billion Rp.
Total	: 704.7 Billion Rp.

5. In Eastern Indonesia, there is no state-owned shipyard having a facility capable to build a ship of 1,000 DWT or over except private shipyards managed by

other industries. The largest state-owned shipyard in the area is PT IKI in Ujung Pandang who is constructing a new graving dock., in which when completed in 1994, a semi container ship of Caraka Jaya Phase III is scheduled to be built. There is another state-owned repairing shipyard named PT.Waiame in Ambon, central part of Eastern Indonesia, having 2 slipways of 500 TLC each, which are busy to repair for fishing boats and not good enough capacity for merchant ships serving in the area. Thus the merchant ships have to go to repairing shipyards outside of Eastern Indonesia despite it being less efficiency in terms of operation.

6. The most remarkable project implemented upto now in this country is Caraka Jaya project which is summarized as follows.

Phase I (1988-90)	: 3,000DWT Cargo ship x 5 ships
Phase II (1990-93)	: 3,650DWT Cargo ship x 12 ships, Do. Semi Container ships x 12 ships
Phase III (1994-95)	: 4,180DWT Do. x 24 ships (Scheduled)

Ship's type: Loa 98m, Bm 16.5m, diesel propelled tween decker with cargo gears.

Shipbuilders: PT.DKB unit 1, 2, 3 and Semarang, PT.PAL, PT.Dock Surabaya, PT. Jasa Marina Indah, PT.Intan. 4 more shipyards may join in Phase III.

7. The main equipments except steel plates for Caraka Jaya ships were supplied by foreign countries because supporting industries in this country are not fully developed. The construction cost of the ship are about 22 billion Rp. in case of semi-container type.

8. Other recent main demands for Indonesian shipbuilders were ferry boats for domestic service (200-500GT) and oil tankers for Pertamina (max. 6,500DWT). Several oceangoing ships for export including 18,900 GT RO/RO are now on order. New project being expected to be realized in near future are container ships for international trade, passenger ships, fishing boats etc.

9. The maximum size of the ship ever built in Indonesian shipyards is a ferry boat of 5,000 GT which 105m in length overall, however, several points such as design capability, planning and management capability for production and procurement of materials etc. have yet to be improved.

D. General Situation of Ship Inspection Activities in Indonesia

10. The Republic of Indonesia ratified various international conventions regarding safety of life at sea and marine pollution prevention such as SOLAS 1974, MARPOL 73/78 and many others which include provisions of ship inspections. The existing ship safety fundamental law of Indonesia, Ordonansi Kapal-Kapal 1935 was established in 1935 and has been enacted. Meanwhile, international conventions have been adopted, enacted and replaced and then taken into the legislation of the Republic of Indonesia. The related legislation is implemented by the operational units in provinces. Ship inspections are carried out by ship inspectors appropriately distributed throughout Eastern Indonesia. A study was carried out on ship inspections from various angles, and the result can be summarized as shown below.

11. Domestic and international rule-making regarding ship inspections: When provisions are considered, it is desirable to have them discussed by related quarters of the country through consideration in a meeting or at least through document consideration in order to make them match the existing circumstances of Indonesia to expect smooth implementation of provisions. Scholars, shipowners, shipbuilders, classification societies and other neutral organizations may be able to participate in the discussion.
12. Independence of ship inspection: Now ship inspection job in Indonesia is carried out as a part of Harbor Master's job. Ship inspection is to be made independent from other jobs.
13. Training and assignment of ship inspectors: Jobs regarding ship inspections should be divided and distributed systematically among offices including head office and many local offices and the inspector's training and the number of ship inspectors should be considered by taking into account the rapidly-changing rules.
14. Trimming of documents: Documents have been issued in a great profusion to insure the perfect implementation of ship inspections. They need trimming work so that they may be utilized in a more efficient way.
15. Type approval system: Type approval system should be established in Indonesian legislation as required by SOLAS convention. This is a very efficient way in ship inspection.
16. Reporting on ship inspections: The results of ship inspections should be reported by the local offices to the headquarters in more efficient way so that they may be used in future inspection planning.
17. Inspection devices: Distribution of ship inspection devices should be put to consideration in view of inspection implementation, ship inspector's safety and the need of peripheral support of the job.
18. Oily-water separators and reception facilities: Inspection and installation of oily-water separators should be encouraged. Sludge reception facilities should be increased in number.
19. Command line: The command line is a very important matter and it should be maintained at all times through various phases such as conferences, training, documents and instructions.

Chapter 8 REVIEW OF THE PRESENT SITUATION IN PORTS AND HARBORS

A. Port System in Indonesia

1. The public ports in Indonesia are classified into two categories. One is named commercial port managed by State Trading Port Corporation (PERSERO), and the other is named non-commercial port directly managed by the governmental office at its location (KANPEL). Commercial ports are used to conduct international and major domestic trade, and a total of 110 commercial ports are managed by four PERSEROs on a geographical basis. Also, the non-commercial port handles local commodities for local industries and residents in its relatively small hinterland.
2. In addition, there are some private ports and berths handling special commodities such as oil, fertilizer, flour, timber, coal and so on. These special ports and berths are constructed, owned and operated by private companies themselves to handle their own cargoes (raw materials or their products) under permission by Minister of Communications.

B. Port Development under REPELITA I-V

3. The Government's strategy for development in the port sub-sector has been based on a phased approach. Initial efforts focused on providing adequate facilities at the four major ports (Jakarta, Surabaya, Belawan, Ujung Pandang) and a few other selected ports. The second phase includes the preparation of master plans and detailed engineering designs for the key 43 ports identified by ISTS as requiring rehabilitation and expansion. The implementation of the resulting investment program is the third phase and is expected to provide the infrastructure necessary to improve efficiency in the port sector. During the fourth phase, which is under way, a considerable portion of the development budget of the ports and shipping sub-sector has been allocated for development and/or rehabilitation of facilities of noncommercial ports, especially in remote islands or isolated areas in Eastern Indonesia.
4. In addition to completing ongoing port projects, the major focus in the port sub-sector under REPELITA V will be on repair and rehabilitation of secondary ports to complement earlier investments in larger ports. Also it should be noted that during REPELITA V high priority is given to upgrade the capacity of container yards. Port sub-sector program contains development of container wharves at 12 ports (9 ports in Western Indonesia, 3 ports in Eastern Indonesia) during the current Repelita. This reflects the government's decisive will to cope with the containerization in interisland shipping as well as international shipping.

C. Port Traffic

Cargo volume

5. Total Cargo volume handled at the ports in Indonesia was 292 million tons in 1990. The total cargo volume increased by 25 million tons (1.20 times) from 1980 to 1985, by and about 107 million tons (1.58 times) from 1986 to 1990. Cargo volume in 1990 was 2.3 times larger than that in 1980.

6. As for total cargo volume handled at the Eastern Indonesian ports in 1990 was about 70 million tons. The total cargo volume in Eastern Indonesia was increased by 14.4 million tons (1.79 times) from 1980 to 1985, and by 34 million tons (1.94 times) from 1986 to 1990. The cargo volume handled at the Eastern Indonesian ports became 3.9 times larger during the last ten years. Share of the cargo volume in Eastern Indonesia increased to 23.99% in 1990 from 13.99% in 1980.

Characteristics of commodity

7. Petroleum products and natural gas, chemical and its products, forestry, and other mining and quarrying products are the four major commodity groups, which occupy about four-fifths of the total cargo handling volume in Indonesia. This commodity trend has been maintained during the past ten years.

Passenger traffic

8. Number of passenger reported by PERSERO I,II,III,IV in 1989 was 6,261,239 (in and out) in Indonesia. As it was reported that 3,180,630 passengers embarked or disembarked at ports in the study area, Eastern Indonesia accounted for 51% of the national total. As for passenger traffic in Eastern Indonesia during 1984-1991, based on PERSERO III,IV report. Growth rate of passenger traffic in Eastern Indonesia during this period was 15.55% per year.

D. Container Traffic and Terminal Development

Historical development of container traffic

9. Containerization has come into widespread use all over the world in the last twenty years. In Indonesia containers were first handled at the port of Tanjung Priok in 1973. After that container cargoes have been handled at many ports including Belawan, Dumai, Teluk Bayur, Palembang, Panjang, Pontianak, Tanjung Priok, Cirebon, Cilacap, Semarang, Surabaya, Bena, Banjarmasin, Balikpapan, Ujung Pandang, Bitung and Ambon.

10. At the port of Tanjung Priok and the port of Surabaya which are the representative ports in Indonesia, container handling volume at these two ports became more than doubled during the last four years. The port of Ujung Pandang handles the largest number of container cargoes in Eastern Indonesia. In comparison with container cargo volume at Tanjung Priok and at Surabaya, that of Ujung Pandang has been very low. On the other hand, there have been gradual increases in container cargoes at some ports in Eastern Indonesia (Bitung, Banjarmasin, Biak).

Container movement

11. In case of international container movement, containers are handled through hub ports both in Indonesia and in foreign countries. In Indonesia the hub ports are Tanjung Priok and Surabaya, while the main foreign hub port for Indonesia is Singapore. The port of Singapore has become the focus of Indonesia's container trades. In the three months from August to October in 1989 container vessels sailed from six originating ports in Indonesia to the container terminal in Singapore; of the total, 3% sailed from Belawan, 71% from Tanjung Priok, 5% from Semarang, 19% from Surabaya, less than 1% from Ujung Pandang and about 1.3% from Panjang.

12. On the other hand, Port of Surabaya which plays an important role in cargo movement in Eastern Indonesia has connections with other main ports in Asia, namely Hong Kong, Kaohsiung, Keelung and Busan.

13. It is expected that containerization of domestic cargoes will increase in pursuit of modernization and safety of cargo handling in Indonesia. Domestic container cargoes have already been handled at some ports in Indonesia.

Containerization rate at Tanjung Priok and Surabaya

14. Tanjung Priok and Surabaya are the advanced ports with regard to the containerization in Indonesia. In particular, containerization has advanced in the field of foreign trade. At Tanjung Priok, the containerization rate increased about 20 points during the last four years and reached 60% in 1990. On the other hand, there has been a gradual increase in the containerization rate at Surabaya. In 1991 containerization rate reached 20% at Surabaya.

Container yard development

15. In Indonesia, container yard improvement is regarded as an important target under REPELITA V. The container yards had a total area of only 66,000 square meters under REPELITA IV. Therefore, the container yard expansion of 657,400 square meters is planned under REPELITA V.

16. Some ports in Eastern Indonesia have improved their container yards under REPELITA V. For example, the container yards are already in operation at Banjarmasin and a new container yard is almost completed at Ujung Pandang. Although full-scale container terminals have not been developed so far in Eastern Indonesia, the improvement of container yards is underway.

E. Port Management and Operation

Roles and functions of Port Administrator's Office (PAO)

17. As a part of the Presidential Instructions 4/1985 (INPRES 85), a set of measures to smoothen the flow of goods to encourage non-oil export, PAO has been established as a governmental organization for coordination and control of port operation to enhance port productivity. The port administrator (ADPEL) is given overall responsibilities not only for the functions of DGSC within the port area

(including harbor master, coast guard and so on) but also for coordinating with other state agencies such as customs, immigration, quarantine and so on. These agencies must work under ADPEL's supervision with regard to port operational matters.

Roles and functions of State Trading Port Corporation (PERSERO PELABUHAN)

18. Four State Trading Port Corporations (PERSERO) were established in 1983 as Public Port Corporations (PERUMPEL) and transferred into the present status (PERSERO) in December 1992. The PERUMPELs should be managed in line with commercial principles, and strive for financial self-sufficiency, but they were not expected to maximize profits as public corporations.

19. The PERUMPELs legally enjoyed considerable autonomy and commercialization, though actually these aspect had not been realized sufficiently. For example, the tariff for port services are still set by the Ministry of Communications. Therefore, in order to further improve business efficiency, the government decided to change their status, namely from PERUMPEL into PERSERO by government regulations no. 56, 57, 58 and 59 in October 1991, and it was enforced in December 1992.

20. In the new status, government's sphere of influence should be reduced and flexibility was given to the PERSERO in making decisions to increase the operational and financial performance.

Port labor supply system

21. In most of Indonesian ports, port laborers are registered in labor cooperate organization (KOPERASI) by each port, which is responsible for organizing gangs and allocating port labor to cargo handling companies as labor pool under control of Port Administrator. Port labor is requested on a daily basis by the cargo handling company from KOPERASI, and all port labor report not to cargo handling company but KOPERASI, so the cargo handling company can not employ and fire their own laborers.

Port tariff structure

22. The structure of port charge consists of the following items

- (a) Anchorage fee (against ship, based on GRT per 15 days)
- (b) Berthing fee (against ship, based on GRT per 24 hours)
- (c) Pilotage fee (against ship, based on ship size)
- (d) Towing fee (against ship, based on ship size per hours)
- (e) Wharf fee (against cargo volume, per ton, m³, head or number of container)
- (f) Storage fee for usage of warehouses and open storage (against stored cargo, per ton, m³, head or number of container / day, but the first ten days are regarded as one day)
- (g) Equipment fee (against usage of equipment per hour)
- (h) Other service fee water supply, electric supply, entrance fee and land and building rent

23. Above items from (a) to (g) are stipulated by Minister of Communications, and only item (h) is determined by the director of PERSERO, but after enforcement of the new act on maritime, power to determine the actual tariff will be in the hands of the director of PERSERO in the standard framework stipulated by Minister of Communications.

F. Port Facility Development

Commercial port

24. There are 110 Commercial ports in Indonesia. The ports in Western Indonesia have a 77.5 % share of the total length of wharves in Indonesia. About 90 % of the wharves at the ports in Western Indonesia have concrete structures, and about 25 % of the wharves at the ports in Eastern Indonesia were constructed by wood.

Non-commercial port

25. There are 546 Non-commercial ports in Indonesia. In general, average and maximum wharf length are longer in Eastern Indonesia than in Western Indonesia. Maximum water depth is also greater in Eastern Indonesia.

Ferry port

26. There are 73 ferry terminals in Indonesia in 1992. In Eastern Indonesia 38 ferry terminals exist. But these ferry terminals in Eastern Indonesia are generally poor and few ports have exclusive mooring facilities.

G. Port Performance

Berth Occupancy Rate (BOR) and Berth Throughput (BTP)

27. Berth occupancy ratio and Berth throughput per berth length are widely used as indicators to evaluate the level of port facility utilization. It is said that a higher berth occupancy ratio and berth throughput are observed as the result of congestion at the terminal. Accordingly, these indices can be used roughly in planning where the productivity target is clearly defined. Figure 8-1 and 8-2 show average BOR and BTP of PERSERO III and IV from 1985 through 1991.

28. The average BOR for the ports of PERSERO III has been higher than that of PERSERO IV. Generally, it is very difficult to operate ports with a berth occupancy ratio above 80 %. Concerning the port productivity represented by BTP, on the contrary, average figure for the ports of PERSERO IV has been higher about 130 tons per meter than that for ports of PERSERO III. It is generally believed that a port which has 1,000 tons per meter of BTP can be conceived as being fully utilized.

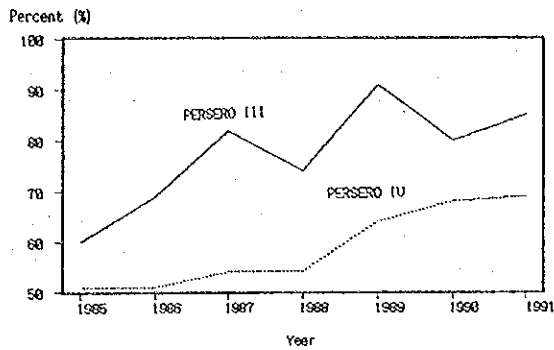


Figure 8-1 Performance for BOR (PERSERO III, IV)

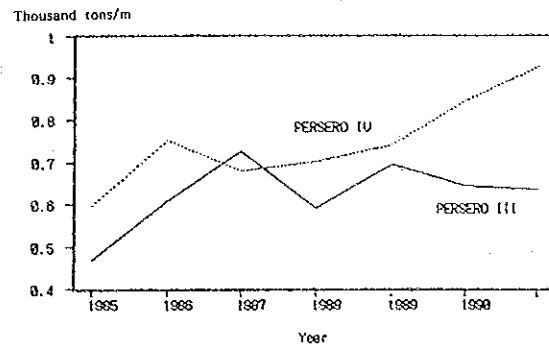


Figure 8-2 Performance for BTP (PERSERO III, IV)

H. Cargo Handling

29. Cargo handling system in Indonesia is divided into three categories: International system for container cargoes, international/interisland system for general cargoes (including semi-container vessels) and rakyat system for sailing boat cargoes.

International system for container cargoes

30. This system is entirely carried out by two or three gantry cranes on wharf which are recognized as modernized equipment all over the world. There are eight gantry cranes in Tanjung Priok and three gantry cranes in Tanjung Perak.

International/interisland system for general cargoes

31. All types of cargo in this system are mostly handled by ship's gear for loading and unloading from/to vessels. Middle size ports which are administrated by PERSERO II handled more cargo volume for all package types of general, bagged and unitized cargoes than those of PERSERO III and IV in Eastern Indonesia.

Rakyat system for sailing boat cargoes

32. This system is operated by hands or shoulders of port workers with practically no cargo handling equipment. One gang normally consists of about 12 members. Port Performance Index (PPI) and Berth Performance Index (BPI) in some of the non-commercial ports in 1992, where sailing boats call, are very low because cargo handling operation has been conducted manually.

I. Existing Port Development Plans

33. At some of the main ports in Indonesia, studies for future port development have been done. The master plan at each port has been made according to these studies. Port improvement works at each port have been implemented based on these master plans.

34. Port development policy until 2000 named "Rencana Pengembangan Pelabuhan Indonesia sampai dengan Tahun" was established by DGSC in 1990. According to this policy, the basic ten conceptions concerning the administration of transport under REPELITA V are explained.

35. It seems that there are some characteristics concerning the port development in Indonesia. First, budget for port improvement and development has more weight in Western Indonesia than Eastern Indonesia before 1990 (fiscal year). Secondly, investment at the main ports like "Gateway Ports" have had the priority up to now.

J. Environmental Issues in Ports

36. In Indonesia, monitoring systems concerning environmental conditions (water quality, air quality, etc.) have not been implemented so far except for some environmental studies. Accordingly, continuous data concerning the present environmental conditions do not exist in urban areas as well as port areas.

37. It seems that environmental issues in ports are divided into two categories, natural environmental issues and socio-economic environmental issues.

38. In Indonesia port development projects have to carry out Environmental Impact Assessment (EIA) according to "Government Regulation No.29, 1986 regarding the Analysis of Impact upon the Environment". To check the EIA regarding the port development, a new organization named "AMDAL Committee" was established in 1988.

K. Technical Problems in Study Ports

39. It seems that following technical problems have been occurred in study ports.

- (a) Water depth and quay alignment
- (b) Crown level of quays
- (c) Soil exploration and selection of pile type
- (d) Fender system
- (e) Strength of concrete aprons
- (f) Standardization of design and construction procedures for small-craft berths
- (g) Maintenance of quays

Chapter 9 REVIEW OF THE PRESENT SITUATION IN MARITIME SAFETY

A. Aids to Navigation (ATN)

1. Development of ATN has recently made progress in the nationwide schedule of Indonesia which was set for the target year 1988/1989 and 2000 by the "Master plan on the Development of the Aids to Navigation System" in technical assistance with JICA as shown in Table 9-1.

Table 9-1 Development of Aids to Navigation in Indonesia

Development Period Type			After 1986					Existing Aids*				
	Prior 1964	1964- 1986	New Cons- struction	Rehabi- litation	Improve- ment	Sub- Total	Unknown Period					
Visual 10 M	490	233	22	53	2	77	191	956				
Aids 30 M			20	14	0	34						
40 M			56	110	33	11			5	49	16	215
L.Bu			0	363	222	0			0	222	275(+)	310
Radio R.Be	0	4	62	0	0	62	0	66				
Aids MWRB	0	0	18	0	0	18	0	18				
D.F.	0	0	5	0	0	5	0	5				

Note: L.Bu=Light Buoy, R.Be=Radar Beacon, MWRB=Medium Wave Radio Beacon, D.F.=Differential Omega, * = refer to Table 9-2, (+): Number of shortage from total number which has been developed up to 1992.

Source: DGSC

2. According to the development situation between 1987 and 1991, the share of the lighthouse/lightbeacon installed anew in Eastern Indonesia runs up to 59% of all new installations in the whole of Indonesia. At the same time, the percentage of rehabilitation works undertaken in Eastern Indonesia is 48% of total works.

3. Even though the coastal length of Eastern Indonesia is much longer than that of Western Indonesia, not to mention that there are more islands as well, the development level of the former is still low. In comparison with Western Indonesia including relatively well progressed Kalimantan east coast, the number of lighthouses/beacons and lighted buoys in Eastern Indonesia in the same distance are two-thirds and one-sixth, respectively.

4. Therefore, it seems that Eastern Indonesia is still behind in the development of ATN. In line with the development of maritime transportation, the development of ATN should be facilitated.

5. It is noted that the navaid's vessels have not undergone rebuilding or that no new vessels have been built since 1970s. However, a plan is at hand for the building and re-building of these vessels.

6. The Indonesian Government conceives of the "Sea Lane" idea. There are two lanes in the Eastern Indonesia, one is a route from Makassar Strait to Lombok or Sape Strait and the other is a route from Molucca Sea to Banda Sea.

B. Maritime Search and Rescue

Situation on maritime accidents/casualties

7. On the average, there are 230 maritime accidents occurring yearly in the Indonesian sea areas in the past 5 years (i.e., from 1987 to 1992). Based on the accidents categorized by cause, most accidents are attributed to adverse weather conditions. Of the total occurrences, 44.5% are due to bad weather. This is followed by factors due to human error (i.e., operational error and carelessness of engine handling) with 36.2% and factors due to hull structure with 19.3%.

8. According to the areas of maritime accident occurrences involving 475 vessels for the three-year period from 1988 to 1990, the regions ranked in order of number of accidents occurring in their area are as follows:

- (a) The northern sea coastal region of Java Island stretching from the center to the eastern parts of Java Sea.
- (b) The region stretching from the vicinity of Jakarta to the Malacca and the Singapore straits through the eastern coastal sea region of the Sumatra Island.
- (c) The region of the Makassar Strait at the eastern portion of Kalimantan Island.
- (d) The vicinity of the Bali Island.

Existing search and rescue system

9. Search and rescue activities in Indonesia are shared mainly by two agencies: the National SAR Agency (BASARNAS) and the Directorate General of Sea Communications (DGSC).

10. BASARNAS is directed by the Committee SAR Indonesia (BASARI) and possesses a coordinative role for the overall maritime and air SAR activities. Under its organization, the country is divided into 4 functional districts with their own Rescue Coordination Centers (RCC). In order to support the 4 RCC, 15 Rescue Sub-Coordination Centers (RSC) have been established.

11. Although BASARNAS holds the coordinative role for SAR, it does not possess any specific rescue assets except Local User's Terminals (LUTs) for COSPAS/SARSAT system. However, vessels and aircraft belonging to the government and military organizations cooperate and comply with its SAR directives.

12. Another main agency in the SAR system is the DGSC. It functionally covers ships' safety, harbor safety, rescue operations, preservation of sea environment, maintenance of navigational aids, control of maritime crimes, etc. The DGSC has the following assets for SAR operations:

- (a) 123 SAR ships including the KPLP fleet consisting of 9 class II ships, 15 class III ships, 32 class IV ships and 67 class V ships
- (b) 49 bases consisting of 5 KPLP fleet bases and 44 ADPEL KPLP bases
- (c) 5 special rescue bases located in Jakarta, Tanjung Uban, Bitung, Ambon and Surabaya
- (d) SAR communication system consisting of the maritime SAR telecommunications with its coast radio station (CRS) and the GMDSS

Chapter 10 REVIEW OF THE PRESENT SITUATION IN SEAFARERS' EDUCATION

A. Present Situation of Seafarers Education in Indonesia

1. Maritime courses in Indonesia are classified into two (as per the Decree of the Minister of Communication No. KM7/1991): the academic stream and the non-academic or professional stream. The academic stream has a civil effect, but the professional one does not.
2. There are six (6) government maritime schools and twenty nine (29) private schools authorized by the Maritime Education and Training Center in the country. The education of seafarers in the government owned and controlled maritime schools are subsidized and, therefore, can provide favorable education opportunities. On the other hand, the private maritime schools are further categorized as academies and senior high schools/maritime middle schools.
3. There are only two rating schools, namely: BPLPD Barombong and BPLPD Surabaya, in the country.
4. Since its establishment in 1980, BPLPD Barombong conducted re-training programs for the existing seafarers of 827 over a period of three years. After that, the school started programs on PD-I, PD-II, and PD-III with a total number of graduates from years 1987 to 1991 of 1,637. Also, the school conducted re-training programs for the existing seafarers to meet the STCW requirement with total graduates of 5,472.
5. BPLPD Surabaya has a total of 788 graduates for years 1989 to 1992. Also, it sent out 1,920 graduates from its special training programs for the STCW compliance in the same period.
6. All maritime students/pupils have to undergo their apprenticeship training on-board merchant vessels plying the inter-island or international trade routes as their sea project to meet the STCW-1978 requirement. The cadets of the government maritime academies fulfill their sea project for 12 months. The students in government rating schools are required to have sea experience on-board merchant vessels prior to continuing their higher level training. Accordingly, students of the PD-II (Pelayaran Dasar II) and PD-III programs are required to have one year sea experience.

B. Current Situation of Seafarers' Education in Eastern Indonesia

7. There are five (5) merchant marine academies and four (4) rating or merchant marine middle schools in Eastern Indonesia. But there is no maritime school in the province of East Timor, Maluku and Irian Jaya.
8. The both public academies and rating schools located in Eastern Indonesia contribute to the enhancement of regional development as a governmental policy, especially in respect of the improving of human resources through maritime education.
9. In relation with the above described, however, existing school capacities are not enough in order to provide educational opportunity to the young people of Eastern Indonesia. Therefore, school capacities and training facilities should be gradually enlarged and improved.

PART II

INTEGRATED MASTER PLAN FOR SEA TRANSPORTATION

Chapter 1 BASIC CONCEPT FOR THE FORMATION OF THE MASTER PLAN

A. Facts and Problems of Present Sea Transportation

1. Eastern Indonesia needs to raise the level of economy and to catch up West, the average economic growth rate in the study area must be higher than national average.
2. Presently level of maritime transportation service in this area is still low. Except for a limited number of large islands served by regular liners and some small ports by the Pioneer lines, a number of islands are left alone for tramper or inefficient Rakyat service.
3. Introduction of deregulation in '80s caused some degeneration of shipping service particularly for small islands. Supply of vessels is now free to depend on international sources. Fluctuation of international shipping market affects directly the service level of domestic route.

B. Regional Development by Means of Maritime Transportation

4. Considering size of the total population in the Eastern Indonesia improvement of maritime transportation will activate effective utilization of resources and industrialization.
5. At present, both domestic and international trade are operated through hub ports in Java. By 2015, however, several hub ports or supply centers will emerge and substitute a part of functions of Java.

C. Implementation of Master Plan

6. With modernization of maritime transportation, improvement in quality, efficiency, safety, and economy are expected. By the year 2005, many items will become conspicuous but the majority will remain as conventional system.
7. Some means of control over domestic shipping will be necessary to secure orderly and reliable shipping service.
8. Renewal of over-aged fleet will achieve modernization of shipping. Improvement and renewal of existing ship yards will be required. Existing Rakyat fleet will gradually diminish during the planning period. However, radical change into steel ships can not be expected in short period of time.
9. During the planning period, containerization will expand at the major ports of the project area. Ferry service will also effectively reduce handling costs for the relatively short distance routes.
10. Supply of seafarers must be linked with future demand in the inter-island shipping activities as well as international market.
11. Navigation safety facilities in Indonesia particularly in Eastern regions are insufficient compared to the international standard. As the projected increase of vessel movement and change in shipping route progress, navigation facilities have to be increased and re-aligned accordingly.

Chapter 2 TRAFFIC DEMAND FORECAST

A. Review of existing Origin-Destination Table

Background

1. On 21 November 1988 the Indonesian Government issued a new policy called PAK NOV 21/88, which aimed to further promote deregulation in the shipping sector. Shipping companies could make their own decisions concerning shipping routes after that time, and thus there are remarkable distinctions in traffic patterns between before 1988 and after 1989. Therefore the latest O-D table will serve as the base year traffic patterns in forecasting future traffic patterns.

Origin-Destination table on seaborne cargo traffic

2. The 1990 Origin-Destination table of the total seaborne cargo serves as a base in forecasting the future cargo movement. In 1990 a total of 72,029,000 tons of cargoes were transported within Indonesia by ships, of which 11,512,900 tons of cargoes moved within Eastern Indonesia.

Origin-Destination table on sea passenger traffic

3. Total of 2,690,819 passengers utilized the Indonesian ports for sea travel in 1990. Thirty-seven percent of the total Indonesian sea passengers originated from Eastern Indonesia. Among 986,823 passengers originating from Eastern Indonesia, 918,422 passengers had destinations within Eastern Indonesia.

B. Socio-Economic Frame

Population projection

4. Population projection by provinces was made through a cooperative venture between The Demographic Institute of University of Indonesia and National Development Planning Board. According to this projection, Indonesia population will grow at an average growth rate of 1.65% through 2005.

Economic framework for 2005

5. Moderate growth scenario in all of Indonesia takes the intermediate course and sets 6% as the GDP growth rate through the target year of 2005.

6. GRDP growth rates by province in Eastern Indonesia are assumed as shown below, taking into consideration both the past records on the economic activities and the projected future population growth for each province.

Eastern Indonesia

7.5% Central Kalimantan, Southeast Sulawesi, Maluku

6.5% West Nusa Tenggara, South Kalimantan, East Kalimantan,
Central Sulawesi, South Sulawesi

5.5% East Nusa Tenggara, North Sulawesi, Irian Jaya

C. Method of Forecasting

Total Cargo flow

7. Single regression models were then constructed in order to project the future traffic volume in Indonesia and each province. Future traffic volume in Indonesia and each province was forecast using these models. Assumed GRDP for each province in 2005 was applied to these models.

8. Annual growth models were applied to some cases in which linear regression models did not show high correlation coefficient of satisfactory level. From the regression analysis mentioned above, traffic demand elasticity for GRDP was calculated and set to be 1.3 through the target year. Frator method was applied to obtained traffic distribution in the target year.

Total passenger flow

9. Total national demand for sea passenger traffic in 2005 was forecast based on single regression model (GDP). Future trip generation/attraction volume in each province was forecast using single regression model employing GRDP.

10. Annual growth models were applied when correlation coefficients of the models were not sufficiently high. Trip demand elasticity for GRDP was derived from the regression analysis, and was set to be 1.5 through the target year.

11. Frater method was applied to obtain traffic distribution in the target year. Travel patterns of sea passengers were not stable over the years as far as OD tables published from the Central Bureau of Statistics were concerned. Therefore, a modified Origin Destination table was constructed based on 1989 and 1990 OD tables. The modified OD table served as the base year traffic distribution.

D. Result of Total Cargo Flow Forecast

12. Table 2-1 shows the result of forecasting on the total cargo flow. It is forecast that the total cargo volumes moving within will increase to 224,635,400 tons in 2005, which is 3.12 times larger than those in 1990. 38,941,300 tons of cargoes will move within Eastern Indonesia in 2005, which is 3.38 times larger than in 1990. The increase rate of local trade (traffic within Eastern Indonesia) is higher than the national average.

E. Result of Total Passenger Flow Forecast

13. Table 2-2 shows the forecast result for forecasting on the 2005 Origin-Destination table of the sea passenger traffic. Total of 11,312,835 people in Indonesia will travel by means of sea transportation in 2005, which is 3.92 times larger than base year traffic. Total of 4,549,017 local trips within Eastern Indonesia will be generated in 2005, which is 5.07 times larger than base year traffic.

Table 2-1 OD Table of Future Sea Cargo Traffic in 2005

(Unit: 1,000 ton)

Destination	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Origin																
1 West Nusa Tenggara	0	203		6			5	36			9	264	118		2,514	2,307
2 East Nusa Tenggara	28	88		1	38		1					156	17	2	25	208
3 Central Kalimantan			110	125	1			76			1	313	310	73	493	1,159
4 South Kalimantan	19	2	141	782	34		4	215			3	1,211	1,062	95	1,082	3,310
5 East Kalimantan	387	259	376	1,357	4,630	1,171	231	3,748	6,087	5,385	578	24,192	9,888	1,981	11,957	47,127
6 North Sulawesi		1			5	630	175	13	5	956	7	1,782	112	5	36	1,344
7 Central Sulawesi	7			2	339	115	36	57	1	232	3	751	212	28	33	1,962
8 South Sulawesi	249	170	24	276	871	452	198	813	683	685	60	4,428	851	371	1,485	7,127
9 Southeast Sulawesi				7	53	12	1	64	62	17		216	87	7	287	597
10 Maluku	2		6	11	70	188	34	30	240	4,528	47	5,153	224	65	148	5,589
11 Irian Jaya	3	8		1	15	12	5	23	1	127	238	432	23	31	1,008	2,895
12 EASTERN INDONESIA	686	735	864	2,577	6,045	2,588	889	5,874	7,808	11,934	923	38,041	11,953	2,655	19,555	72,185
13 East Java	182	71	214	373	887	116	158	1,614	72	364	98	4,133	387	115	6,484	11,839
14 DKI Jakarta	147	18	17	65	374	383	53	869	11	112	393	2,344	389	22	4,191	6,859
15 Rest of Indonesia	244	689	522	585	6,487	172	32	682	2,691	1,554	65	13,872	12,128	15,287	82,346	133,833
16 TOTAL INDONESIA	1,289	1,516	1,417	3,521	13,887	3,251	923	8,248	9,993	13,904	1,381	59,238	24,688	18,079	122,577	224,635

Table 2-2 OD Table of Future Sea Passenger Traffic in 2005

(Unit: Person)

Destination	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Origin																
1 West Nusa Tenggara	21,048	43,654	180	8,984	4018	120	10	107,027		387		185,958	7,000		553,958	747,815
2 East Nusa Tenggara	43,654	114,390	78	1,288		46	12	18083		57	8	176,566	15,854	1,422	29,776	221,818
3 Central Kalimantan			2,193	177								2,549	5,514	77		9,148
4 South Kalimantan	8,994	1,288	177		3,552			2,521				16,584	189,279		99,834	225,617
5 East Kalimantan	4,818			3,552	515,378	42,543	47,227	437,348		12,186	378	1,863,233	149,247	52,452	10,975	1,276,887
6 North Sulawesi	120	36			42,543	226,052	33,521	19,134		185,164	13,972	442,452	15,229	20,757	16,445	494,883
7 Central Sulawesi	18	12			47,227	33,521	51,761	58,928	228	32,086	1,728	217,532	25,357	8,695	785	252,259
8 South Sulawesi	187,825	18,868		2,521	437,348	19,134	58,928	1,564	28,139	44,007	29,815	736,594	112,214	99,892	17,003	935,643
9 Southeast Sulawesi									228	28,139	386,468	58,281	7891	439,837	19,815	6,814
10 Maluku		57			12,186	185,164	32,086	44,067	58,281	892,953	37,425	1,892,596	47,741	17,885	5,127	1,182,462
11 Irian Jaya		8			378	13,972	1,728	29,815	7,001	37,446	95,780	105,436	24,815	3,938	1,282	220,253
12 Eastern Indonesia	185,958	175,566	2,549	16,584	1,863,233	442,452	217,532	736,588	430,037	1,892,596	185,998	4,549,017	529,064	185,446	785,446	6,000,821
13 East Java	7,099	15,064	5,614	189,279	148,347	15,229	25,387	112,214	18,915	47,741	24,315	829,664	28,885	13,122	13,788	595,381
14 DKI Jakarta		1,422			59,652	28,757	8,695	86,832	5,814	17,885	8,938	185,984	13,122		636,788	835,755
15 Rest of Indonesia	553,958	29,776		99,834	10,975	16,445	765	17,003	281	5,127	1,282	735,445	13,708	656,789	2,595,859	3,891,788
16 TOTAL INDONESIA	747,013	221,818	8,140	225,617	1,276,887	484,883	252,259	935,643	455,947	1,102,459	228,223	6,880,821	565,381	635,785	3,891,788	11,312,835

Chapter 3 SHIPPING SUB-SECTOR DEVELOPMENT PLAN

A. Sea Transportation Network Plan

Formulation of sea transportation network plan for common carrier traffic

1. In formulating the sea transport network plan, such sea transportation of public nature, viz common carrier traffic, is focused. Therefore, in this study the common carrier traffic means the traffic handled by domestic liner/tramper vessels including Rakyat shipping, but excluding specialized traffic (ex special shipping and non-shipping).
2. Based on the Study Team's planning works such as future traffic demand forecast, traffic assignment on assumed waterway network, future routes classification by deployable vessel size and possibility of containerization, sea transportation network plan for the year of 2005 is made out, which is shown in the Figure 3-1.
3. Eastern Indonesia is very wide, and in 2005 main traffic routes will still be to/from Java Island. Traffic between Java, Kalimantan, and Sulawesi will be heavier and Nusa Tenggara will be closer with Surabaya, while the traffic in Maluku and Irian Jaya will still have to rely on the small vessels, including Perintis shipping service, for local distribution or feeder from main ports scattered in those areas.
4. Looking into the general traffic flow in Eastern Indonesia, outgoing traffic from Java to Eastern Indonesia will still be predominant compared with incoming traffic, which may present a kind of impediments to the healthy development of the shipping industry for future. By establishing efficient shipping network it is hoped that new industries will be induced to such regions and that the regional development will be further pursued, whereby the traffic within the regions may also increase in the long term.
5. Regarding the containerization, semi-container vessels will be utilized gradually as well as conventional type general cargo vessels up to the year of 2005.
6. Concerning the passenger traffic, sea transportation will continue to be the most common and economical means considering its magnitude and diversity. Most of the areas in Eastern Indonesia will be widely covered by PELNI passenger ships for long distance travellers, with short distance travelling still to be covered by Perintis ships or ferry boats. These routes will have to be well determined for possible connection service wherever possible.

Proposal for standard-type vessels for common carrier traffic

7. In order to arrange newbuildings necessitated by new tonnage and replacement demands, it is proposed that the standard-type vessels are built by series construction whereby the vessels' construction cost can be reduced.
8. After examining the existing vessel sizes for each vessel type category, and considering the future traffic demand increase and efficient vessel operation, three types of standard vessels are proposed as L-Type:5,000 DWT, M-Type:2,500 DWT, and S-Type:1,000 DWT.

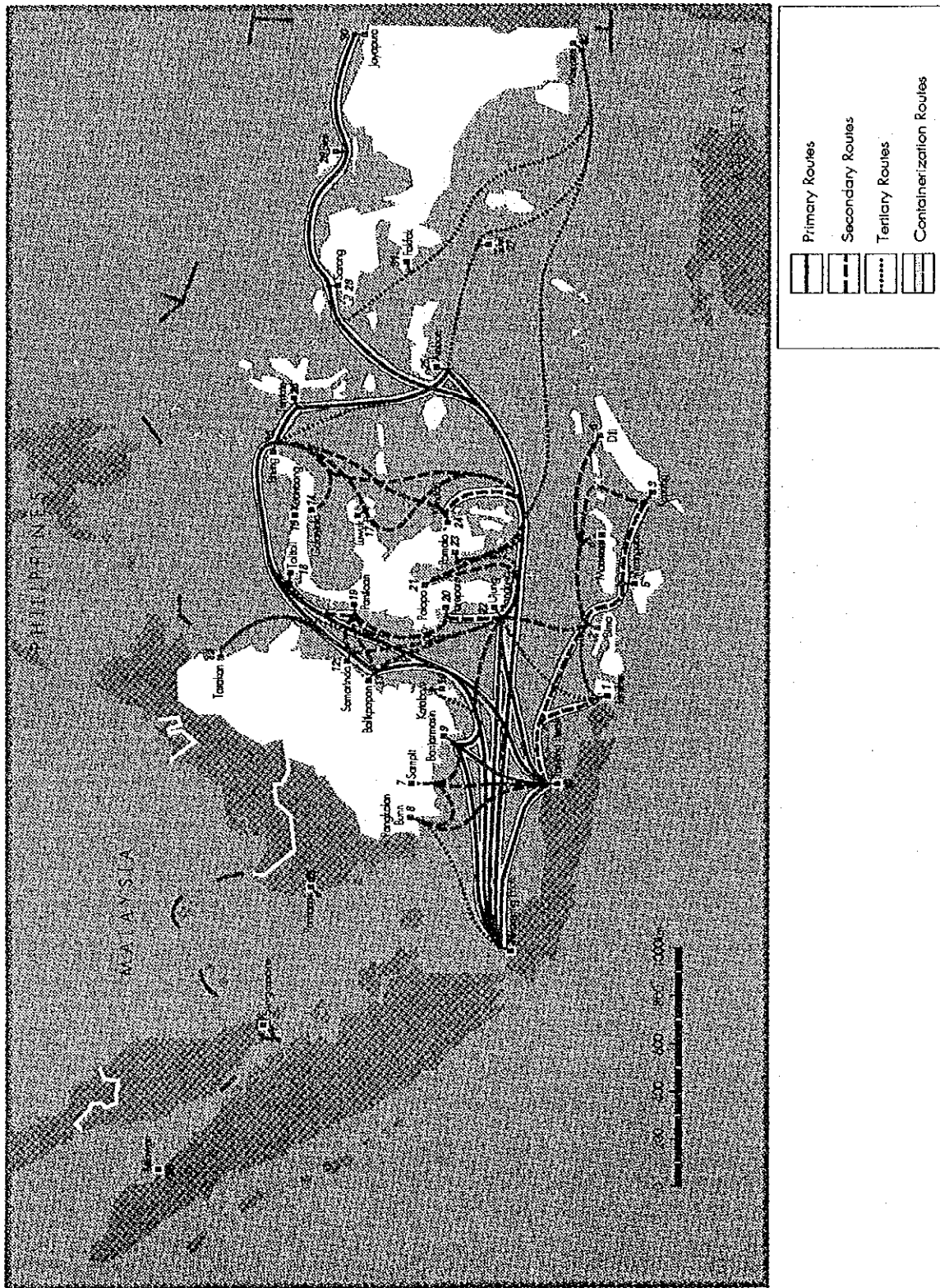


Figure 3-1 2005 Sea Transportation Network Plan for Common Carrier

Future common carrier fleet in Eastern Indonesia

9. Under assumed operating conditions by the Study Team, the common carrier fleet will have to expand in order to cope with future traffic demand. As to traffic demand, it can be estimated in terms of ton-miles as the result of traffic assignment. Consequently, optimal fleet tonnage is calculated at 608,885 dwt in 2005.

10. After calculating the ton-mile distribution for each route classification by vessel types, the fleet demand by vessel types is estimated as shown in Figure 3-2. The smaller type vessels will have less increase demand, while the larger vessels will have greater demand in future.

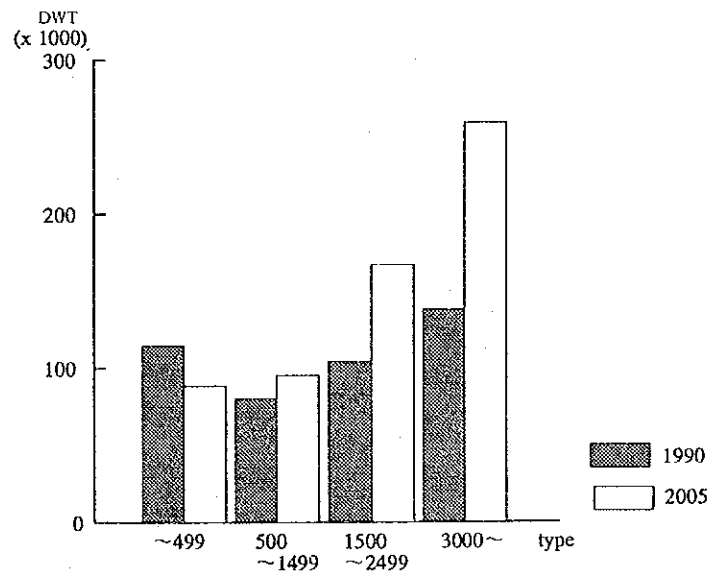


Figure 3-2 Common Carrier Fleet Demand Forecast for Eastern Indonesia

B. Shipping Industry Development Plan

Inter-island shipping development plan

11. In order to foster inter-island shipping industry, the study team proposes the following five kinds of improvement measures.

(a) Restriction of establishment of shipping companies

12. Under the existing regulations, a shipping company can be established with governmental approval as far as the company owns or controls at least one ship of more than 100 cubic meters or one tugboat of more than 125 HP with a barge of more than 100 cubic meters. These conditions apply regardless of shipping activities they are going to engage in.

13. From the viewpoint of regular service capability and, in case of maritime accidents, damage compensation capability, such conditions should be reviewed with more strict requirements for owned tonnage, working capital, etc., by business

activity or serving area, whereby fostering responsible operations of sound business basis and ensuring safe transportation. This may also lead to the stable transportation service.

(b) Restriction of foreign vessels for common carriers

14. In order to keep the orderly market mechanism, foreign charter vessels should be restricted. Especially short-term or trip charter vessels which are often employed for cargo carriage by dumping the freight rates should be prohibited, and in the long run such charter vessels are to be replaced with domestic buildings in order also to enhance the domestic shipbuilding industry which in turn will be important to the development of national shipping.

(c) Monitoring of fleet capacity control

15. It is suggested that a proper function should be implemented within DGSC, making use of the data computerization, to monitor the fleet demand and supply situation so that the overtonnage situation may be checked, whereby unnecessary excessive competition among operators is to be avoided.

(d) Fleet modernization

16. When above-mentioned measures are properly taken, together with affordable financing measures taken by the Government or PT. PANN, the fleet modernization in Eastern Indonesia will be possible and should be done. In order to modernize the fleet it is considered most appropriate that the newbuildings will be constructed in the domestic shipyards, and that in order to save the construction cost the series construction of the standard-type vessels is most suitable, for which three types of standard-type vessels are proposed in the separate section of this Chapter.

(e) Upgrade of sea transportation

17. Upgrade of sea transportation is inevitable in line with increment and diversification of cargo traffic. In this context, sea transportation can be modernized through operators' efforts by means of rationalization and enlargement of management as well as the guidance of the Government. Needless to say, there is a large room for such efforts. For that reason, domestic operators should tackle various management improvements as follows:

- (i) effective management by means of merger of operators in Eastern Indonesia traffic
- (ii) efficient navigation by means of joint operation among operators in the above traffic
- (iii) encouragement of containerization
- (iv) instruction of expert knowledge and technical information to managers as well as other staff for efficient and economical operation

Perintis shipping development plan

18. Today Perintis shipping serving remote and underdeveloped areas with governmental subsidy contributes to regional development to a great extent. Therefore, its position shall be enhanced by operational improvement, efficient use of subsidy and better demarcation of public and private operators' role.

19. Efficient use of subsidy is equal to the compatibility between minimum subsidy and maximum service. The current bidding system is excellent to check subsidy amount year after year while it is not suitable to raise local operators in a long term. Therefore, the following new scheme which is called fixed subsidy ratio system is proposed.

- (a) DGSC plans routes and operating conditions.
- (b) DGSC appoints operators based on endorsement of local governments for minimum 3-5 years.
- (c) DGSC subsidizes the appointed operators to assure sound management based on calculation by fixed subsidy ratio (e.g. 80% of loss) within budget.

20. The above fixed subsidy ratio is applied to the lesser loss between the assumed loss which is estimated with planned operating conditions and some formulas before operation, and the resultant loss which is assessed by the responsible agency concerned after yearly settlement of account of the operation. This method can expect rationalization of operators to some extent, because the operators make efforts lest the resultant loss should exceed the assumed loss.

Rakyat shipping improvement plan

21. Taking account of special and traditional characteristics in local sea transportation, it is likely that Rakyat shipping will continue its activities for further long time in the same manner keeping the existing fleet capacity up to 2005, although its role may be lowered to some extent in the progress of modernization of sea transport. In the said situation, it is considered that improvement of its fleet is a better solution than its replacement for the time being, by means of reforming the structure of wooden hull and attaching devices for safe navigation. In this connection, the study of reforming the structure of wooden hull should be pursued.

C. Maritime Transport Supporting System Plan

Basic design for safe operation management system

22. Taking account of existing operation system, it should be necessary for the shipping operators to have consciousness to control every condition concerning the operation of ships. And it can be said that the management system for safe operation is one of the most efficient and effective measures to materialize the safety of the transportation and to prevent the marine pollution in both public and private sectors.

23. Therefore, it is necessary to legislate new rules/regulations for the safe operation management system of passenger ship operators and ferry operators to ensure the safety and marine environment, taking the following steps into consideration:

- (a) Establishment of standards and model of the operation management manual.
- (b) Establishment of supervisory function for operation management system.
- (c) Appointment of supervisory official by the Minister of Communications from the staff of DGSC and DGLT who have abundant experiences as both an administrator and a seaman.

- (d) Preparation and filing of the operation management manual by the shipping companies concerned to the Ministry of Communications.
- (e) Designation and filing of staff of operation management such as manager, sub-manager by the shipping companies concerned to DGSC or DGLT.

24. The conceptual flow of safe operation management system is shown in Figure 3-3.

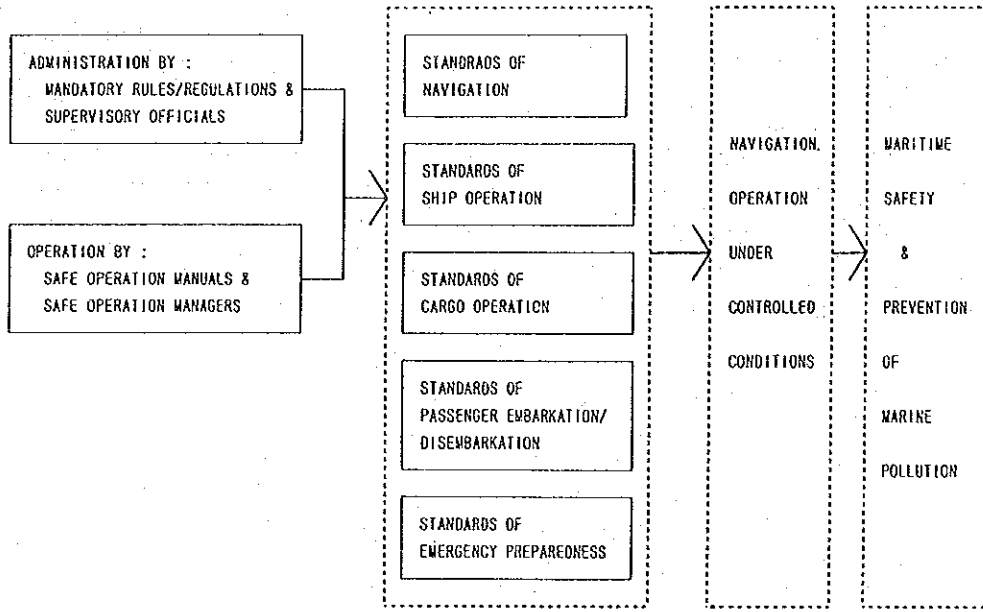


Figure 3-3 Conceptual Flow of Safe Operation Management System

Basic design for Integrated Maritime Database System (IMDS)

25. In recent years, each Directorate office has made concerted or initial efforts to develop individual database system, and output data have been exchanged periodically in fixed format. These database, however, should be integrated for efficient routine administrative activities and for effective planning works.

26. More concretely, the database system should be designed that every operator can retrieve necessary data from one computer, which is the reason why the Integrated Maritime Database System (IMDS) is proposed for DGSC.

27. The proposed IMDS consists of two (2) sub-systems i.e., (a) Relational Database Sub-system, (b) Analysis and Planning Sub-system.

- (a) Relational Database Sub-system:
It functions in case of data entry, update, modification and elementary analysis.
- (b) Analysis and Planning Sub-system:
It functions in case of further analysis and planning works with utilization of advanced planning models and graphic presentation.

28. The hardware network to support the proposed IMDS will function to connect computers in DGSC as local area network (LAN), by which network, every computer will be able to enjoy operation based on all database in DGSC directly.